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FEBRUARY 1979 Number 414 -- Part 1

Solar-Geophysical Data prompt reports

Data for January 1979 -- December 1978

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noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA AND INFORMATION SERVICE / BOULDER, COLORADO

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Solar - Geophysical Data

NO. 414 FEBRUARY 1979

Part I (Prompt Reports)

DATA FOR
JANUARY 1979
DECEMBER 1978

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BOULDER, COLORADO

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SOLAR-GEOPHYSICAL DATA

No. 414

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Chief
Solar-Terrestrial Physics Division

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DETAILED COVERAGE FOR 1978 AND 1979 PUBLISHED IN "SOLAR-GEOPHYSICAL DATA"

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F.1i	Cosmic Ray Neutron Counts (Kiel)	403A138	404A138	405A150	406A161	407A155	409A155	409A134	410A152	411A150	412A154	413A149		
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Notes:

"410A 48" listed under 1978 Aug means that the sunspot drawings for August 1978 were contained in *Solar-Geophysical Data* Number 410 - Part I, beginning on page 48.

A = Part I, B = Part II.

—— = no data available.
blank = data not yet received.

JANUARY 1979 DATA

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ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

JANUARY 1979

PRESTO MESSAGES (THE RAPID REPORT OF MAJOR EVENTS).

08 JANUARY 1979 BOULDER 08/0315Z SOFLARE M3/1B N17E48 08/0229Z DURATION 31 MINUTES.
TENFLARE 680 FLUX UNITS 08/0225Z DURATION 24 MINUTES.
14 JANUARY 1979 BOULDER 14/0234Z SOFLARE X1/1B N15W14 13/1904Z DURATION 33 MINUTES.

15 JANUARY 1979 BOULDER 15/1435Z SOFLARE M2/2B S17W79 15/1340Z DURATION 28 MINUTES.

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	Flares: No. of Total	Flares: M	Flares: X	Outstanding events	Forecasts: Date	Forecasts: Location Lat-Long	Forecasts: Desc*	Alert Situations
001	1	31	257	203	014	N12W42	0	0	0		1	N12W42	E	SOLNIL MAGQUIET
						S29W13	0	0	0			S29W13	Q	
						S15W13	0	0	0			S15W13	E	
						S18W05	0	0	0			S18W05	Q	
						S19W26	0	0	0			S19W26	Q	
						S22E02	2	0	0			S22E02	A	
						S33E07	1	0	0			S33E07	Q	
						S35E42	0	0	0			S35E42	E	
						N17E39	0	0	0			N17E39	Q	
						S12E41	1	0	0			S12E41	Q	
						S21E44	0	0	0			S21E44	Q	
						N13E54	3	0	0			N13E54	Q	
						N18W29	0	0	0			N18W29	Q	
002	2	1	332	203	008	N12W55	2	0	0		2	N12W55	A	SOLALERT 02/05 MAGQUIET
						S29W27	0	0	0			S29W27	Q	
						S15W26	0	0	0			S15W26	Q	
						S18W18	0	0	0			S18W18	Q	
						S18W39	0	0	0			S18W39	Q	
						S22W10	0	0	0			S22W10	E	
						S33W06	1	0	0			S33W06	Q	
						S35E29	0	0	0			S35E29	E	
						N16E26	0	0	0			N16E26	Q	
						S13E27	2	0	0			S13E27	A	
						S20E31	1	0	0			S20E31	Q	
						N13E41	1	0	0			N13E41	Q	
						N18W42	0	0	0			N18W42	Q	
						S21E07	0	0	0			S21E07	Q	
003	3	2	272	208	009	N12W68	2	0	0		3	N12W68	E	SOLALERT 03/05 MAGQUIET
						S29W40	0	0	0			S29W40	Q	STRATALERT WESTHEM 03 JANUARY 1979
						S15W40	0	0	0			S15W40	Q	SERIES OF MINOR STRATOSPHERIC WARM-
						S17W30	1	0	0			S17W30	Q	INGS BEGINNING LATE NOVEMBER HAS LED
						S22W25	0	0	0			S22W25	A	TO LARGE SCALE WARM SYSTEM WITH AXIS
						S33W18	0	0	0			S33W18	Q	FROM CENTRAL ASIA IN MID-STRATO-
						S35E16	0	0	0			S35E16	A	SPHERE TO ARCTIC RUSSIA NEAR STRATO-
						N16E12	0	0	0			N16E12	Q	PAUSE. EQUATORIAL COOLING TREND
						S12E13	5	0	0			S12E13	E	PERSISTS. STRATALERT NIL.
						S20E17	1	0	0			S20E17	Q	
						N13E26	2	0	0			N13E26	Q	
						N18W54	1	0	0			N18W54	Q	
						S20W06	0	0	0			S20W06	Q	
						S15E78	0	0	0			S15E78	Q	
						N25E75	1	0	0			N25E75	Q	
004	4	3	341	220	015	N12W83	0	0	0		4	N12W83	Q	SOLALERT 04/06 MAGQUIET
						S30W50	0	0	0			S30W50	Q	
						S15W53	1	0	0			S15W53	Q	
						S16W44	0	0	0			S16W44	Q	
						S22W37	0	0	0			S22W37	E	
						S33W37	0	0	0			S33W37	Q	
						S35E05	1	0	0			S35E05	E	
						S13W01	9	1	0			S13W01	A	
						S20E03	0	0	0			S20E03	Q	
						N13E14	0	0	0			N13E14	Q	
						N18W74	0	0	0			N18W74	Q	
						S19W20	0	0	0			S19W20	Q	
						S16E71	1	0	0			S16E71	Q	
						N25E59	3	0	0			N25E59	E	
005	5	4	208	205	024	S15W66	0	0	0		5	S15W66	Q	SOLALERT 05/07
						S16W58	0	0	0			S16W58	Q	MAGALERT MINOR 05/XX
						S21W49	0	0	0			S21W49	E	
						S31W51	0	0	0			S31W51	Q	
						S33W10	0	0	0			S33W10	E	
						S12W15	2	0	0			S12W15	A	
						S19W09	0	0	0			S19W09	Q	
						N12W01	0	0	0			N12W01	Q	
						S19W33	0	0	0			S19W33	Q	
						S18E58	1	0	0			S18E58	Q	
						N23E46	0	0	0			N23E46	Q	
006	6	5	268	200	016	S32W75	0	0	0		6	S32W75	Q	SOLALERT 06/08 MAGALERT MINOR 06/XX
						S15W81	0	0	0			S15W81	Q	
						S16W72	0	0	0			S16W72	Q	
						S22W62	1	0	0			S22W62	E	
						S31W64	2	1	0			S31W64	Q	
						S34W22	0	0	0			S34W22	A	
						S12W28	1	0	0			S12W28	E	
						S19W22	0	0	0			S19W22	Q	
						N12W11	0	0	0			N12W11	Q	
						S19W47	1	0	0			S19W47	Q	
						S17E45	1	0	0			S17E45	CA	
						N24E33	1	0	0			N24E33	CA	
						N10E30	0	0	0			N10E30	Q	
						N17W36	1	0	0			N17W36	Q	
						N17E71	0	0	0			N17E71	E	
						S14W15	0	0	0			S14W15	Q	

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Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions				Outstanding events	Forecasts			Alert Situations
						Location Lat-Long	No. of Flares Total	M	X		Date	Location Lat-Long	Desc*	
007	7	6	270	196	013	S15W84	0	0	0		7	S15W84	Q	SOLALERT 07/XX MAGNIL
						S22W74	2	0	0			S22W74	CA	
						S31W75	0	0	0			S31W75	CA	
						S35W32	1	0	0			S35W32	Q	
						S12W41	0	0	0			S12W41	E	
						S19W34	0	0	0			S19W34	Q	
						N13W27	0	0	0			N13W27	Q	
						S17W67	2	0	0			S17W67	Q	
						S18E34	0	0	0			S18E34	E	
						N14E21	1	0	0			N14E21	DA	
						N09E18	0	0	0			N09E18	Q	
						N17W48	1	0	0			N17W48	Q	
						N17E63	0	0	0			N17E63	Q	
						N28W54	1	0	0			N28W54	E	
						S08E76	0	0	0			S08E76	Q	
008	8	7	294	194	018	S22W90	0	0	0		8	S22W90	Q	SOLALERT MAGQUIET MINOR WARMING IN EURASIAN AREA IS IN LATE STATE OF DEVELOPMENT. WARM ANOMALY PREVAILS FROM ASIA IN LOWER STRATOSPHERE TO SCANDINAVIA IN UPPER STRATOSPHERE. WAVE TWO CIRCULATION PATTERN IN MID-STRATOSPHERE LARGELY REFLECTS LOW ALTITUDE CONDITIONS. EQUATORIAL COOLING TREND HAS BEEN REVERSED.
						S31W89	0	0	0			S31W89	Q	
						S19W80	0	0	0			S19W80	Q	
						N27W65	2	0	0			N27W65	Q	
						N17W61	0	0	0			N17W61	Q	
						S12W55	0	0	0			S12W55	E	
						N34W55	0	0	0			N34W55	Q	
						S19W49	0	0	0			S19W49	Q	
						S35W45	0	0	0			S35W45	E	
						N13W38	0	0	0			N13W38	Q	
						N08W13	0	0	0			N08W13	Q	
						N10E06	4	0	0			N10E06	CA	
						N24E09	3	0	0			N24E09	Q	
						S18E19	0	0	0			S18E19	E	
						N17E50	0	0	0			N17E50	E	
						N16E62	0	0	0			N16E62	Q	
						S09E63	0	0	0			S09E63	Q	
						N20E64	1	0	0			N20E64	Q	
009	9	8	245	207	006	S35W58	0	0	0	PRESTO BOULDER	9	S35W58	Q	SOLALERT 09/11 MAGQUIET STRATALERT
						S12W64	0	0	0	08/0315Z		S12W64	Q	
						S19W62	0	0	0	SOFLARE M3/1B		S19W62	Q	
						N13W51	0	0	0	N17E48 08/0229Z		N13W51	Q	
						S18E06	0	0	0	DURATION 31 MINUTES		S18E06	Q	
						N24W04	0	0	0	TENFLARE 680 FLUX		N24W04	Q	
						N10W07	0	0	0	UNITS 08/0225Z		N10W07	A	
						N17W72	0	0	0	DURATION 24 MINUTES		N17W72	Q	
						N16E38	1	1	0			N16E38	E	
						N27W77	0	0	0			N27W77	Q	
						S09E53	0	0	0			S09E53	Q	
						N34W68	0	0	0			N34W68	Q	
						N09W26	0	0	0			N09W26	Q	
						N16E49	0	0	0			N16E49	Q	
						N20E55	0	0	0			N20E55	Q	
						S29E80	0	0	0			S29E80	Q	
010	10	9	220	200	012	S35W74	2	0	0	PRESTO KAKIOKA	10	S35W74	Q	SOLALERT MINOR 10/11 MAGQUIET
						S19W74	0	0	0	09/0700 MAGSTORM		S19W74	Q	
						N14W67	0	0	0	09/0340Z		N14W67	Q	
						S18W04	0	0	0			S18W04	Q	
						N24W18	0	0	0			N24W18	Q	
						N10W21	6	0	0			N10W21	E	
						N16E23	0	0	0			N16E23	A	
						N16E36	1	0	0			N16E36	A	
						N20E39	1	0	0			N20E39	Q	
						S28E63	0	0	0			S28E63	Q	
						N26E59	0	0	0			N26E59	Q	
						S23E41	0	0	0			S23E41	Q	
011	11	10	272	193	006	S35W85	0	0	0		11	S35W85	Q	SOLNIL MAGQUIET
						S19W87	0	0	0			S19W87	Q	
						N13W82	0	0	0			N13W82	Q	
						S17W18	0	0	0			S17W18	Q	
						N24W33	0	0	0			N24W33	Q	
						N09W36	4	0	0			N09W36	E	
						S27E49	0	0	0			S27E49	Q	
						N27E45	0	0	0			N27E45	Q	
						S22E27	0	0	0			S22E27	Q	
						S25E66	0	0	0			S25E66	Q	
						S18E56	0	0	0			S18E56	Q	
						S12E60	0	0	0			S12E60	Q	
						S27W06	0	0	0			S27W06	Q	
						N17E11	1	0	0			N17E11	E	
						N16E22	0	0	0			N16E22	E	
						N21E26	0	0	0			N21E26	Q	

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012	12	11	253	185	005	S17W30	4	2	0		12	S17W30	E	SOLQUIET MAGQUIET
						N24W46	0	0	0			N24W46	Q	
						N10W48	3	1	0			N10W48	E	
						N17W02	0	0	0			N17W02	Q	
						N16E08	8	0	0			N16E08	E	
						N22E11	0	0	0			N22E11	Q	
						S27E36	0	0	0			S27E36	Q	
						N27E32	0	0	0			N27E32	Q	
						S23E11	0	0	0			S23E11	Q	
						S24E52	3	0	0			S24E52	E	
						S19E44	0	0	0			S19E44	Q	
						S11E48	0	0	0			S11E48	Q	
						S27W18	0	0	0			S27W18	Q	
						N24W60	1	0	0			N24W60	Q	
						S24E20	0	0	0			S24E20	Q	
						N19E36	0	0	0			N19E36	Q	
013	13	12	216	181	007	S17W44	4	1	0		13	S17W44	E	SOLQUIET MAGQUIET
						N24W56	0	0	0			N24W56	Q	
						N10W61	0	0	0			N10W61	Q	
						N17W22	2	0	0			N17W22	Q	
						N15W03	7	0	0			N15W03	A	
						S27E23	0	0	0			S27E23	Q	
						N27E19	0	0	0			N27E19	Q	
						S23W00	0	0	0			S23W00	Q	
						S24E40	0	0	0			S24E40	Q	
						S20E31	0	0	0			S20E31	Q	
						N24W75	0	0	0			N24W75	Q	
						S26E08	0	0	0			S26E08	Q	
						N10E69	0	0	0			N10E69	Q	
014	14	13	209	201	006	S17W57	2	2	0	PRESTO BOULDER	14	S17W57	A	SOLALERT 14/XX MAGQUIET
						N08W75	1	0	0	14/0235Z		N08W75	CA	
						N16W36	0	0	0	SOFLARE X1/1B		N16W36	Q	
						N15W15	7	1	1	N15W14 13/1904Z		N15W15	DP	
						S26E12	0	0	0	DURATION 33 MINUTES		S26E12	Q	
						N27E04	0	0	0			N27E04	Q	
						S23W06	0	0	0			S23W06	Q	
						S22E27	0	0	0			S22E27	Q	
						S20E20	1	0	0			S20E20	CA	
						S29E00	1	0	0			S29E00	Q	
						N10E56	0	0	0			N10E56	Q	
015	15	14	284	214	007	S17W71	2	1	0		15	S17W71	P	SOLALERT 15/XX MAGQUIET
						N18W87	0	0	0			N18W87	E	
						N17W47	1	0	0			N17W47	Q	
						S08W34	0	0	0			S08W34	Q	
						N16W28	6	0	0			N16W28	DP	
						S27W01	0	0	0			S27W01	Q	
						N27W08	0	0	0			N27W08	Q	
						S23W19	5	0	0			S23W19	E	
						S22E06	0	0	0			S22E06	E	
						S29W14	0	0	0			S29W14	Q	
						N10E43	0	0	0			N10E43	Q	
						N15W11	0	0	0			N15W11	Q	
						S13W00	0	0	0			S13W00	Q	
016	16	15	243	203	010	S17W83	8	1	0		16	S17W83	A	SOLALERT 16/XX MAGQUIET
						N17W60	0	0	0			N17W60	Q	
						N16W41	9	1	0			N16W41	A	
						S24W31	1	0	0			S24W31	Q	
						S22W07	3	0	0			S22W07	E	
						N09E30	0	0	0			N09E30	Q	
						N14W24	0	0	0			N14W24	Q	
						S13W13	0	0	0			S13W13	Q	
						N11W31	0	0	0			N11W31	Q	
						S17E52	0	0	0			S17E52	Q	
						N18E69	0	0	0			N18E69	Q	
						S15E74	0	0	0			S15E74	Q	
017	17	16	226	198	008	N17W73	0	0	0	PRESTO BOULDER	17	N17W73	Q	SOLALERT 17/19 MAGQUIET
						N15W54	11	1	0	15/1435Z		N15W54	A	
						N27W32	0	0	0	SOFLARE M2/2B		N27W32	Q	
						S23W46	0	0	0	S17W79 15/1340Z		S23W46	Q	
						S23W20	2	0	0	DURATION 28 MINUTES		S23W20	E	
						N09E17	0	0	0			N09E17	Q	
						N14W39	0	0	0			N14W39	Q	
						S13W27	1	0	0			S13W27	Q	
						N11W44	1	0	0			N11W44	Q	
						S18E40	0	0	0			S18E40	Q	
						N18E59	1	0	0			N18E59	Q	
						S15E62	0	0	0			S15E62	Q	
						N20E04	0	0	0			N20E04	Q	

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						Location Lat-Long	No. of Flares Total	M	X		Date	Location Lat-Long	Desc*	
018	18	17	171	179	004	N15W68	10	0	0		18	N15W68	E	SOLNIL MAGQUIET
						S24W60	0	0	0			S24W60	Q	
						S23W33	3	0	0			S23W33	E	
						N10E03	0	0	0			N10E03	Q	
						N14W54	0	0	0			N14W54	Q	
						N11W57	0	0	0			N11W57	Q	
						N19E46	1	0	0			N19E46	Q	
						S14E48	2	0	0			S14E48	Q	
						N20W08	0	0	0			N20W08	Q	
						S10E72	0	0	0			S10E72	Q	
019	19	18	246	182	011	N16W81	9	0	0		19	N16W81	A	SOLQUIET MAGQUIET
						S23W75	0	0	0			S23W75	Q	
						S23W48	1	0	0			S23W48	CE	
						N10W09	0	0	0			N10W09	Q	
						N12W71	0	0	0			N12W71	Q	
						N18E33	0	0	0			N18E33	Q	
						S16E35	9	0	0			S16E35	CA	
						N20W21	0	0	0			N20W21	Q	
						S12E63	0	0	0			S12E63	Q	
						S23W06	3	0	0			S23W06	CE	
						S20E48	0	0	0			S20E48	Q	
						N11E71	1	0	0			N11E71	Q	
						S27E62	0	0	0			S27E62	Q	
020	20	19	245	194	015	N16W93	2	0	0		20	N16W93	Q	SOLALERT 20/XX MAGQUIET
						S23W88	0	0	0			S23W88	Q	
						S23W60	4	0	0			S23W60	CA	
						N09W23	0	0	0			N09W23	Q	
						N18E18	8	1	0			N18E18	DA	
						S15E23	1	0	0			S15E23	Q	
						S12E44	1	0	0			S12E44	Q	
						S23W18	4	1	0			S23W18	A	
						S20E33	1	0	0			S20E33	Q	
						N14E55	4	0	0			N14E55	E	
						S26E50	1	0	0			S26E50	Q	
						N12E65	2	0	0			N12E65	Q	
						N20E80	0	0	0			N20E80	Q	
021	21	20	328	204	011	S25W73	1	0	0		21	S25W73	E	SOLQUIET MAGQUIET
						N10W37	0	0	0			N10W37	Q	
						N19E04	1	0	0			N19E04	A	
						S14E10	0	0	0			S14E10	Q	
						S12E32	0	0	0			S12E32	Q	
						S23W32	0	0	0			S23W32	A	
						S19E19	0	0	0			S19E19	Q	
						N13W44	0	0	0			N13W44	E	
						S26E36	0	0	0			S26E36	Q	
						N10E56	0	0	0			N10E56	Q	
						N20E66	0	0	0			N20E66	E	
						S34E02	0	0	0			S34E02	Q	
						S11E43	0	0	0			S11E43	Q	
						S15E35	0	0	0			S15E35	Q	
						S12E71	0	0	0			S12E71	Q	
						S26E78	0	0	0			S26E78	Q	
						N08E10	0	0	0			N08E10	Q	
						N06E27	0	0	0			N06E27	Q	
022	22	21	282	217	009	N10W50	0	0	0		22	N10W50	Q	SOLALERT 22/XX MAGQUIET
						N18W06	7	1	0			N18W06	A	
						S14W02	0	0	0			S14W02	Q	
						S12E18	0	0	0			S12E18	Q	
						S22W45	0	0	0			S22W45	E	
						N13E32	3	0	0			N13E32	E	
						S26E23	3	0	0			S26E23	E	
						N10E35	1	0	0			N10E35	A	
						N20E53	2	0	0			N20E53	E	
						S34W10	0	0	0			S34W10	Q	
						S13E66	1	0	0			S13E66	Q	
						S25E74	0	0	0			S25E74	DE	
						N08W01	0	0	0			N08W01	Q	
						N07E14	0	0	0			N07E14	Q	
023	23	22	309	234	007	N10W63	0	0	0		23	N10W63	Q	SOLALERT 23 MAGQUIET
						N18W19	4	0	0			N18W19	A	STRATALERT WESTHEM 23 JANUARY 1979
						S14W15	0	0	0			S14W15	Q	STRATALERT EXISTS TEMPERATURE
						S12E07	1	0	0			S12E17	Q	INCREASES OF 30 TO 40 DEG C JAN 18
						S23W58	0	0	0			S23W58	Q	TO 22 IN MID TO UPPER STRATOSPHERE
						N13E19	6	0	0			N13E19	A	AT 50 TO 60 N AND 80 TO 120 E.
						S27E10	1	0	0			S27E10	Q	RENEWED EQUATORIAL COOLING INTENSIFY-
						N10E21	7	0	0			N10E21	E	ING ALEUTIAN ANTICYCLONE MOVING
						N20E40	6	0	0			N20E40	E	NORTHWARD. POSSIBILITY OF FURTHER
						S34E23	1	0	0			S34E23	Q	DEVELOPMENT AS MAJOR HIGH LATITUDE
						S14E51	2	0	0			S14E51	Q	WARMING.
						S25E60	2	0	0			S25E60	Q	STRATWARM ALERT /WEDNESDAY/ STRATWARM
						N08E14	0	0	0			N08E14	Q	EXISTS. STRONG WARMING IN MID TO
						N06W02	0	0	0			N06W02	Q	UPPER STRATOSPHERE OVER EASTERN
						S23E78	0	0	0			S23E78	Q	SIBERIA.

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						Location Lat-Long	No. of Flares Total	M	X		Date	Location Lat-Long	Desc*	
024	24	23	319	232	018	N11W76	0	0	0		24	N11W76	Q	SOLALERT 24 MAGALERT MINOR 24
						N19W31	3	0	0			N19W31	E	STRATWARM STRATALERT
						S14W28	0	0	0			S14W28	Q	STRATALERT WESTHEM 24 JANUARY 1979
						S11W05	4	0	0			S11W05	Q	STRATALERT EXISTS. WARMING OF MID
						S23W71	0	0	0			S23W71	Q	TO UPPER STRATOSPHERE OVER SIBERIA
						N12E05	1	0	0			N12E05	E	EXTENDING TOWARD ARCTIC. FURTHER
						S25W03	0	0	0			S25W03	Q	INCREASE OF ALEUTIAN ANTICYCLONE.
						N10E07	2	0	0			N10E07	Q	STRATWARM ALERT /THURSDAY/ STRAT-
						N21E26	5	0	0			N21E26	A	WARM EXISTS LARGE WARM AREA OVER
						S33W37	0	0	0			S33W37	Q	SIBERIA EXTENDING NORTHEASTWARD.
						S15E35	6	0	0			S15E35	A	
						S26E47	4	0	0			S26E47	A	
						N09W31	0	0	0			N09W31	Q	
						N08W16	0	0	0			N08W16	Q	
						S22E60	1	0	0			S22E60	Q	
025	25	24	304	214	013	N12W86	0	0	0		25	N12W86	Q	SOLALERT MINOR 25 MAGALERT MINOR
						N21W44	0	0	0			N21W44	Q	25 STRATALERT STRATWARM
						S14W43	0	0	0			S14W43	Q	STRATWARM ALERT /FRIDAY/ STRATWARM
						S11W19	2	0	0			S11W19	Q	EXISTS SIBERIA TO ARCTIC REGION IN
						S22W76	0	0	0			S22W76	Q	MID TO UPPER STRATOSPHERE.
						N13W09	3	0	0			N13W09	A	STRATALERT WESTHEM 25 JAN 1979
						N26W17	1	0	0			N26W17	Q	STRATALERT EXISTS. WARMING IN UPPER
						N11W06	2	0	0			N11W06	Q	STRATOSPHERE EXTENDING OVER ARCTIC
						N20E14	2	0	0			N20E14	Q	REGION ASSOCIATED WITH MID STRATO-
						S33W50	0	0	0			S33W50	Q	SPHERE WARMING IN SUB POLAR SIBERIAN
						S15E22	9	0	0			S15E22	A	REGION. LIMITED WARMING IN LOWER
						S27E33	4	0	0			S27E33	E	STRATOSPHERE LIKELY BUT SIGNIFICANT
						N08W40	0	0	0			N08W40	Q	CIRCULATION EFFECTS EXPECTED WITH
						N08W31	0	0	0			N08W31	Q	ENHANCED ALEUTIAN-CANADIAN ANTI-
						S23E45	0	0	0			S23E45	Q	CYCLONE.
						S27W24	0	0	0			S27W24	Q	
026	26	25	356	215	027	N21W57	0	0	0		26	N21W57	Q	SOLALERT 26/XX MAGALERT 26/28
						S15W57	0	0	0			S15W57	Q	STRATALERT
						S12W31	0	0	0			S12W31	Q	STRATWARM ALERT /SATURDAY/ STRAT-
						S23W90	0	0	0			S23W90	Q	WARM EXISTS SIBERIA TO ARCTIC
						N12W23	0	0	0			N12W23	DE	REGION IN MID TO UPPER STRATOSPHERE.
						S26W30	0	0	0			S26W30	Q	STRATALERT EXISTS SIBERIA TO ARCTIC
						N10W19	0	0	0			N10W19	Q	REGION IN MID UPPER STRATOSPHERE.
						N20E01	0	0	0			N20E01	Q	ALEUTIAN ANTICYCLONE FURTHER
						S34W64	0	0	0			S34W64	Q	STRENGTHENING.
						S15E08	10	1	0			S15E08	A	
						S27E21	2	1	0			S27E21	A	
						N08W54	0	0	0			N08W54	Q	
						S23E33	0	0	0			S23E33	Q	
						S28W37	0	0	0			S28W37	Q	
						N19W17	0	0	0			N19W17	Q	
						N23E32	0	0	0			N23E32	Q	
027	27	26	348	199	015	N21W70	0	0	0		27	N21W70	Q	SOLALERT MAGALERT 27/28
						S15W71	0	0	0			S15W71	Q	STRATALERT STRATWARM
						S12W44	0	0	0			S12W44	Q	STRATWARM EXISTS. WARM REGION IS
						N13W36	0	0	0			N13W36	Q	EXTENDING FROM EAST SIBERIA TO
						S26W43	0	0	0			S26W43	Q	ALASKA ALEUTIAN HEIGHT IS QUASI-
						N10W33	0	0	0			N10W33	Q	STATIONARY. TEMPERATURE AT 67N
						N20W13	4	0	0			N20W13	DA	124E INCREASED 25 DEGREES IN A WEEK
						S34W76	0	0	0			S34W76	Q	AT 30 MB, 27TH 1200 GMT.
						S15W04	8	0	0			S15W04	A	
						S26E07	0	0	0			S26E07	Q	
						N08W66	0	0	0			N08W66	Q	
						S23E20	0	0	0			S23E20	Q	
						S28W51	0	0	0			S28W51	Q	
						N19W32	0	0	0			N19W32	Q	
						N23E18	0	0	0			N23E18	Q	
						S30E30	0	0	0			S30E30	Q	
						S23E34	0	0	0			S23E34	Q	
028	28	27	285	209	014	N22W83	1	0	0		28	N22W83	Q	SOLALERT 28/XX MAGALERT 28/30
						S14W83	0	0	0			S14W83	Q	STRATALERT
						S12W61	0	0	0			S12W61	Q	STRATWARM ALERT /MONDAY/ WARMING IN
						N13W49	7	0	0			N13W49	DP	UPPER STRATOSPHERE EXTENDING OVER
						S26W54	2	0	0			S26W54	E	ARCTIC REGION ASSOCIATED WITH MID
						N10W46	5	0	0			N10W46	CA	STRATOSPHERE WARMING IN SUBPOLAR
						N20W24	9	0	0			N20W24	DP	SIBERIAN REGION.
						S14W19	5	0	0			S14W19	CA	
						S27W04	1	0	0			S27W04	Q	
						S23E07	0	0	0			S23E07	Q	
						S27W64	1	0	0			S27W64	Q	
						N19W45	0	0	0			N19W45	Q	
						N23E05	0	0	0			N23E05	Q	
						S30E15	0	0	0			S30E15	Q	
						S16E52	0	0	0			S16E52	Q	
						N19E76	0	0	0			N19E76	Q	

ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE

JANUARY 1979

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	No. of Flares: Total	M	X	Outstanding events	Forecasts: Date	Location Lat-Long	Desc*	Alert Situations
029	29	28	280	215	012	S12W74	0	0	0		29	S12W74	Q	STRATWARM SOLALERT 29/XX
						N13W63	2	2	0			N13W63	A	MAGALERT MINOR 29/31
						S25W66	0	0	0			S25W66	Q	STRATWARM ALERT /TUESDAY/ WARM
						N11W61	5	2	0			N11W61	A	REGION COVERS EASTERN SIBERIA.
						N20W39	0	0	0			N20W39	Q	ALEUTIAN HIGH IS QUASI-STATIONARY.
						S14W33	5	0	0			S14W33	CA	(TOKYO MESSAGE). STRATALERT
						S26W18	0	0	0			S26W18	Q	WESTHEM. STRATALERT EXISTS. RECENT
						S23W04	0	0	0			S23W04	Q	STRATOSPHERIC WARMING WHICH PEAKED
						N18W59	0	0	0			N18W59	Q	AROUND JAN 25 HAS BEEN FOLLOWED BY
						S17E37	0	0	0			S17E37	Q	COOLING OF UPPER STRAT IN EURASIAN
						N18E66	0	0	0			N18E66	Q	ARCTIC AND SLIGHT WARMING AT
						S30E27	0	0	0			S30E27	Q	EQUATOR. NEW THERMAL PULSE EVIDENT
						N09E78	4	0	0			N09E78	CA	IN SOUTH EUROPE MAY CONTRIBUTE TO
						S28W09	0	0	0			S28W09	Q	FURTHER HIGH LATITUDE DEVELOPMENT.
030	30	29	250	218	010	N14W76	1	0	0		30	N14W76	CA	SOLALERT 30/XX MAGALERT MINOR
						S25W79	1	0	0			S25W79	CA	30/XX STRATALERT TOKYO STRATWARM
						N10W75	2	0	0			N10W75	E	STRATALERT WESTHEM STRATALERT EXISTS
						S20W52	1	0	0			S20W52	CA	WARM REGION DEVELOPING OVER EUROPE
						S14W47	3	0	0			S14W47	E	MOVING NORTHEASTWARD. PROBABLE
						S26W30	1	0	0			S26W30	Q	FURTHER AMPLIFICATION OF WARM ANTI-
						S23W17	0	0	0			S23W17	Q	CYCLONE OVER SIBERIA ALASKA REGION
						N19W73	5	0	0			N19W73	E	DURING NEXT WEEK.
						S14E24	1	0	0			S14E24	Q	
						N17E54	0	0	0			N17E54	Q	
						N08E63	3	0	0			N08E63	A	
						N21E64	2	0	0			N21E64	Q	
						S11E81	0	0	0			S11E81	Q	
						S36E61	0	0	0			S36E61	Q	
031	31	30	221	202	008	S25W90	0	0	0		31	S25W90	Q	SOLNIL MAGALERT MINOR 31
						N10W87	1	0	0			N10W87	Q	STRATALERT
						N21W65	0	0	0			N21W65	Q	STRATALERT WESTHEM 31 JANUARY 1979
						S14W60	0	0	0			S14W60	Q	2130 GMT STRATALERT EXISTS.
						S26W42	2	0	0			S26W42	A	WARMING INCREASES OVER EUROPE.
						S23W30	0	0	0			S23W30	Q	
						N18W85	0	0	0			N18W85	Q	
						N16E41	1	0	0			N16E41	Q	
						S29E02	0	0	0			S29E02	Q	
						N09E50	3	0	0			N09E50	E	
						N22E52	3	0	0			N22E52	E	
						S12E66	1	0	0			S12E66	Q	
						S33W48	0	0	0			S33W48	Q	
						N16E54	0	0	0			N16E54	Q	
032	01	31	197	200	008	N22W76	0	0	0		1	N22W76	Q	SOLQUIET MAGNIL STRATALERT
						S12W76	0	0	0			S12W76	Q	
						S25W56	5	0	0			S25W56	Q	
						S23W46	0	0	0			S23W46	Q	
						N17E28	0	0	0			N17E28	Q	
						N06E35	2	0	0			N06E35	Q	
						N20E37	0	0	0			N20E37	Q	
						S14E54	1	0	0			S14E54	Q	
						S38E34	0	0	0			S38E34	Q	
						N13E42	0	0	0			N13E42	Q	
						N18W15	0	0	0			N18W15	Q	
						S21E68	0	0	0			S21E68	Q	

* Q=Quiet E=Eruptive A=Active P=Proton C=Caution D=Doubtful O.G.=Other Groups MF=Major Flare

RELATIVE SUNSPOT NUMBERS

ZURICH, R_z

1978 PROVISIONAL — 1979

DAY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
1	128	93	70	77	119	46	42	127	90	109	110	158
2	120	83	68	85	93	61	48	167	119	122	110	158
3	131	95	71	91	74	47	38	151	107	125	117	191
4	138	103	75	76	60	34	62	161	91	129	108	157
5	137	76	94	74	51	54	74	175	55	116	104	146
6	129	67	92	73	29	57	66	178	71	103	122	173
7	121	90	88	70	39	84	58	148	95	110	132	163
8	89	99	105	56	45	105	62	120	103	118	142	172
9	94	95	126	59	36	108	64	109	121	108	152	165
10	96	92	111	57	29	115	67	105	149	116	138	163
11	95	85	109	63	57	127	58	84	158	122	170	157
12	92	78	107	65	62	111	71	72	158	99	168	159
13	93	65	93	72	56	114	85	88	156	90	165	159
14	82	62	75	72	62	109	93	113	170	78	150	162
15	59	72	61	78	89	102	72	133	166	59	140	178
16	64	78	85	91	97	110	42	148	163	77	138	164
17	56	66	99	79	103	98	49	136	137	92	139	164
18	55	72	100	85	115	78	53	158	123	88	120	146
19	53	64	107	84	109	74	42	150	154	85	90	138
20	52	51	115	74	109	76	28	163	151	76	70	177
21	63	77	112	73	154	77	26	172	144	62	58	181
22	74	82	109	73	158	48	36	148	125	77	50	178
23	69	85	105	72	158	33	45	156	116	53	57	188
24	78	82	102	82	154	38	45	167	103	57	68	209
25	94	70	139	86	135	30	54	163	96	85	79	209
26	86	53	115	84	152	13	37	152	91	101	93	173
27	79	50	98	97	134	21	55	140	115	118	110	162
28	88	49	75	90	130	31	58	122	117	118	122	157
29		48	72	103	115	48	59	122	137	109	135	153
30		44	70	107	99	35	70	91	129	96	148	149
31		70		109		36	100		98		167	130
MEAN	89.8	73.5	94.7	79.3	94.1	68.4	56.7	137.3	122.8	96.6	119.1	165.8

1977 yearly mean = 27.5

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO

FLUX ADJUSTED TO 1 A.U., S_a

1978 — 1979

DAY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
1	139.1	136.3	130.0	181.4	149.1	142.9	106.0	159.8	139.0	152.0	166.6	194.1*
2	152.6	141.1	129.8	183.0	147.0*	127.6	106.0	171.7*	137.8	159.0	167.6	200.1
3	156.6*	146.6	134.5	182.2A	130.8	116.5	109.6	167.0	131.7	169.9	164.2	203.5*
4	154.0	148.4	143.3*	178.4	118.6	117.4	112.3	174.4*	132.0*	177.4	165.3	192.7*
5	159.0	154.5	146.7*	173.9*	116.9	118.9	117.6	179.4	138.7*	181.2	169.5	194.9
6	156.1	162.8	145.3*	173.1	109.8	119.3*	122.6	181.1	137.4	172.2*	164.5	190.9
7	157.3	165.2	146.9	162.6*	110.6	128.9	128.2	177.5	141.6	174.6	178.5*	186.2
8	157.0*	168.7	148.6	143.4	109.3	135.9	130.6	167.1	150.1	168.0*	189.9	200.1
9	155.2	183.7	156.1	135.1	106.5	147.1*	128.1*	157.6*	155.8	164.9*	189.6	192.6
10	148.7	179.1	155.4	129.5	108.4	156.0*	127.5	149.8	162.3	166.3	204.7	186.2
11	154.2	175.2	162.8*	133.8	113.2	163.2*	121.7	141.5	171.6*	163.7	218.5	179.5
12	159.0	169.8	156.2	138.2	116.4*	174.2*	124.5	138.5	177.2	150.4	217.3	174.5
13	151.2	160.9	145.6	140.2	120.3*	165.5	134.9	138.0	178.5	145.3	210.6*	193.9
14	148.4	160.5	139.1	143.7	126.4*	163.1	132.7	143.5*	180.1	136.3	197.0	200.0*
15	136.8	154.2	141.4	146.1	132.5	169.5	130.0*	152.6	182.0	133.8	192.7	192.1*
16	138.2	143.3	137.6	147.8*	139.5*	163.4	123.6	161.5	176.7*	128.8	180.5	189.9*
17	125.9	135.4	133.4	143.8	149.0	159.5	119.3*	161.8	171.5	128.1	177.7	175.7
18	124.9	132.3	134.1	135.6	153.5*	154.1*	115.6	169.3*	169.4	127.4	161.5	177.6
19	119.1	128.1	139.5*	133.6	162.0*	148.6	111.6	168.8*	170.4	128.9	152.9	187.8
20	122.2	125.3	138.1	132.3*	174.2	142.9*	107.5	168.6	171.0	134.9	138.1	197.2
21	122.2	118.2	138.4*	132.7	185.4*	140.2	104.8	172.5	166.9*	126.0	132.1*	210.3
22	127.7	117.0	146.4	135.7*	190.3	127.0	106.0	171.5*	161.4	127.1	132.7	226.9
23	131.8	116.4	162.9	142.9*	196.7	123.4*	104.1	165.5*	161.4	121.9	133.4	225.1
24	135.6	117.5	159.8	146.5*	194.8	118.5	105.4	158.9	156.9	123.5	135.2*	208.5
25	139.3	118.2	159.1*	147.6	183.5	113.7	104.2	157.2	156.1	124.7*	138.0	206.1
26	134.8	112.5	166.7	152.8	182.4*	112.2	100.7	148.5	154.4	132.7	144.2	192.9
27	137.5	114.1	172.8	150.6*	179.5	110.8	107.3*	146.2*	150.7	144.4*	148.7*	205.4
28	135.4	112.7	176.6*	147.1*	174.1	109.9	107.7*	147.8	148.4*	154.1	164.1	209.6
29		111.1	185.2	148.6	167.4	109.2	116.2	148.1	149.8	162.2	166.2	209.3
30		115.4*	182.1*	147.2*	154.6*	109.2	124.1	142.6	146.5	167.8	181.7	194.1*
31		124.5		152.6		108.8	133.9*		144.8		195.1	193.7
MEAN	141.8	140.3	150.5	149.7	146.8	135.4	116.9	159.6	157.1	148.2	170.0	196.5

* adjusted for burst
A = interpolated data point

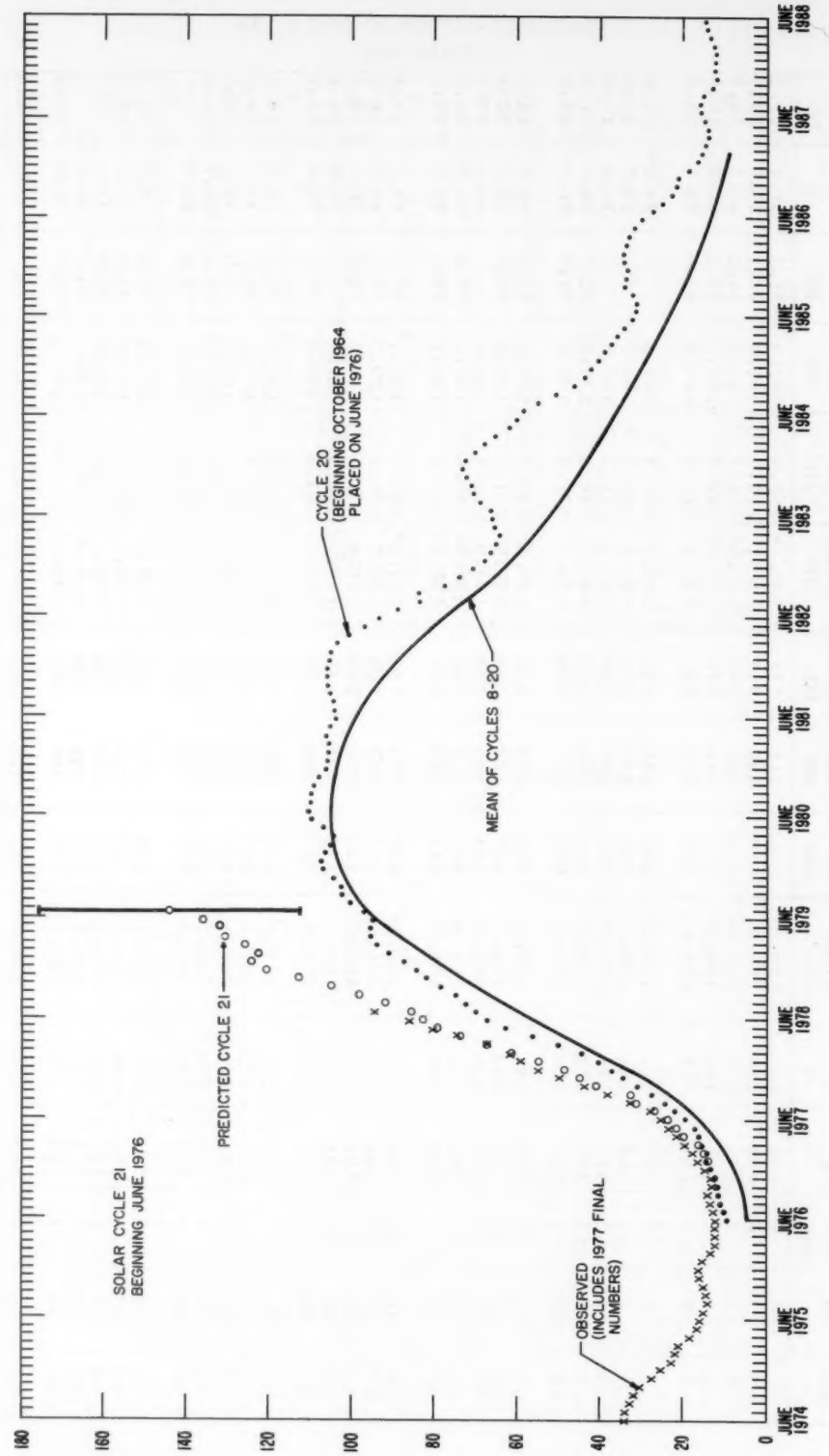
DAILY SOLAR INDICES

JANUARY 1979

JAN 1979	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	SUNSPOT NUMBERS		OBSERVED FLUX	SOLAR FLUX ADJUSTED TO 1 A.U.								
			R_Z	$R_{A'}$	OTTAWA 2800	AFGL 15400	AFGL 8800	AFGL 4995	OTTAWA 2800	AFGL 2695	AFGL 1415	AFGL 606	AFGL 410	AFGL 245
1	1	5	158	168	200.7*	604	381	238	194.1*	212.4	142.9	81.2	37.1	12.2
2	2	6	158	178	206.9	609	384	247	200.1	210.7	151.2	80.0	39.6	20.1
3	3	7	191	175	210.4*	612	387	250	203.5*	224.7	152.2	84.1	41.1	14.7
4	4	8	157	158	199.3*	607	384	235	192.7*	202.0	153.2	89.3	40.2	14.5
5	5	9	146	158	201.6	611	393	232	194.9	211.0	147.6	81.0	39.3	14.3
6	6	10	173	170	197.4	599	386	230	190.9	207.2	145.3		39.2	14.4
7	7	11	163	164	192.6	598	378	222	186.2	202.0	144.2		33.7	13.4
8	8	12	172	191	206.9	601	377	225	200.1	200.0	147.8		38.9	17.1
9	9	13	165	172	199.2	604	376	228	192.6	198.8	139.8	92.7	46.3	21.6
10	10	14	163	180	192.6	603	371	226	186.2	197.1	136.8	91.0	51.1	29.0
11	11	15	157	154	185.6	592	373	214	179.5	189.7	138.3	90.0	45.6	18.1
12	12	16	159	143	180.5	597	382	210	174.5	181.4	138.6	85.7	42.3	30.8
13	13	17	159	139	200.5	607	380	229	193.9	201.6	140.8		42.6	27.2
14	14	18	162	170	206.8*	612	380	240	200.0*	202.6	144.4	77.6	42.2	30.0
15	15	19	178	166	198.7*	616	380	224	192.1*	200.0	140.6	80.4	41.1	15.2
16	16	20	164	174	196.2*	606	374	232	189.9*	206.7	138.1	77.0	43.1	18.5
17	17	21	164	157	181.5	603	367	208	175.7	175.2	129.2	75.1	40.6	16.2
18	18	22	146	123	183.5	611	390	219	177.6	191.4	125.2	78.0	36.1	15.1
19	19	23	138	127	194.0	617	391	231	187.8	204.7	131.2	77.3	38.3	21.6
20	20	24	177	161	203.7	601	396	236	197.2	203.6	136.4	77.4	38.4	14.2
21	21	25	181	181	217.3	605	390	239	210.3	214.0	139.6	75.2	38.5	15.4
22	22	26	178	219	234.2	609	383	242	226.9	226.5	147.1	79.4	37.0	14.9
23	23	27	188	201	232.3	625	403	252	225.1	235.5	155.0	78.3	38.2	15.7
24	24	1	209	204	215.2	608	375	233	208.5	216.2	151.3	79.6	38.7	14.4
25	25	2	209	192	212.7	600	372	225	206.1	208.0	154.0	76.6	49.5	
26	26	3	173	160	199.1	597	370	220	192.9	200.0	150.0	71.4	27.5	14.8
27	27	4	162	154	211.8	603	374	224	205.4	203.0	147.2	71.8	27.2	16.7
28	28	5	157	157	216.1	611	378	234	209.6	206.4	141.8	72.6	32.6	22.6
29	29	6	153	147	215.8	615	391	234	209.3	213.1	138.0	79.2	38.0	
30	30	7	149	136	200.1*	609	388	224	194.1*	212.5	142.5	77.5	36.9	16.0
31	31	8	130	116	199.5	602	388	214	193.7	214.2	151.5	80.7	37.9	17.6
MEAN			165.8	164.4	203.0	606	382	230	196.5	206.4	143.3	80.0	39.3	18.1

* Adjusted for burst.

Note: Data gaps in AFGL Sagamore Hill are due to equipment problems.



OBSERVED AND PREDICTED SUNSPOT NUMBERS

SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
CYCLE 21

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1976	15.2	13.2	12.2	12.6	12.5	12.2	12.9	14.0	14.3	13.4	13.5	14.8
1977	16.7	18.1	20.0	22.2	24.2	26.3	28.8	33.0	38.5	44.6	50.5	55.4
1978	59.6	62.7	67.7	74.9	81.0	87.0	95.0	99.8	104.1	107.9	112.2	118.0
								(3)	(6)	(8)	(8)	(9)
1979	122.8	127.1	131.3	133.9	136.3	140.6	144.7	147.6	149.6	150.8	151.2	150.7
	(11)	(13)	(17)	(22)	(26)	(29)	(32)	(34)	(35)	(36)	(37)	(38)
1980	149.4	148.1	147.4	147.9	147.4	144.3	140.8	138.0	136.4	135.4	134.0	132.7
	(38)	(38)	(36)	(36)	(37)	(38)	(41)	(42)	(42)	(43)	(45)	(47)
1981	132.5	132.0	129.6	126.7	124.1	121.5	120.3	119.9	119.0	117.5	115.0	112.0
	(50)	(50)	(48)	(47)	(47)	(46)	(45)	(44)	(44)	(44)	(43)	(41)
1982	109.1	106.1	103.6	101.7	99.6	97.3	93.7	89.3	85.3	80.8	77.6	74.0
	(38)	(37)	(36)	(34)	(32)	(30)	(28)	(26)	(24)	(21)	(20)	(20)
1983	69.8	66.8	64.7	62.5	60.2	57.7	55.6	53.7	52.0	50.8	50.0	49.2
	(20)	(20)	(21)	(22)	(22)	(23)	(24)	(26)	(27)	(29)	(30)	(31)
1984	48.1	46.3	43.6	40.4	38.0	36.8	35.9	34.3	32.7	31.5	30.3	28.7
	(31)	(30)	(29)	(29)	(30)	(31)	(31)	(31)	(30)	(29)	(28)	(27)
1985	27.6	26.7	25.9	25.4	24.7	23.7	23.0	22.2	21.5	20.6	19.7	19.1
	(27)	(26)	(26)	(26)	(26)	(24)	(23)	(22)	(22)	(23)	(24)	(24)
1986	18.6	17.9	17.1	16.2	15.0	13.7	12.8	12.2	12.0	11.8	11.6	11.6
	(24)	(24)	(24)	(23)	(22)	(21)	(19)	(19)	(17)	(16)	(15)	(13)
1987	12.0	12.7	13.5	14.5	15.6	16.7	17.8					
	(12)	(11)	(11)	(11)	(12)	(13)	(14)					

The table gives observed Zürich smoothed sunspot numbers for Cycle 21 up to the one calculated from the latest observed data, marked by a vertical bar. They are based on final Zürich numbers through 1977 and provisional Zürich numbers thereafter. Some of these data after the June 1976 value will change slightly when final data for 1978 are received. The numbers after the vertical bar are predictions by the McNish-Lincoln method (see *Explanation of Data Reports*, February 1978). Shown in parentheses are the corresponding absolute values of the 90% confidence interval, an indication of the uncertainty above and below the predicted number.

The McNish-Lincoln method is very sensitive to the identification of a minimum epoch. In SGD 390-401 issues, the Cycle 21 predictions were based on March 1976 as the minimum epoch. Latest studies, including one published by Waldmeier, show that June 1976 is the more appropriate epoch of minimum. Thus, we have adopted a June 1976 mimimum.

*Prediction of Sunspot Maximum -- The McNish-Lincoln prediction method is recommended for predictions up to only one year ahead. From that point, the predictions regress rapidly towards the mean value. Combining this McNish-Lincoln prediction of sunspot maximum with the Ohl method (as done by Sargent, see *Explanation of Data Reports*, February 1978) indicates that the most probable value for sunspot maximum is 152 ± 33.

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JAN	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
PALE	01	0325	0328	0329	N12	W46	.757		28.7	4	SN	2	C		27		DE
TEHR	01	0857E	0905U	0906	S12	E39	.629		4.3	9D	SB	1	C		190		U
RAMY	01	1827	1902	1926	N11	W54	.833		28.7	59	SN	2	C		24		
PALE	01	1830	1832	1836	N12	W54	.835		28.7	6	SN	3	C		23		
PALE	01	2102	2102	2107	S21	E37	.627		4.7	5	SN	3	C		69		
PALE	01	2106	2108	2114	N13	E44	.739		5.2	8	SN	3	C		37		
RAMY	02	1704	1704	1714	S17	W28	.492		31.6	10	SB	2	C		23		
RAMY	02	1725	1725	1730	N12	E31	.584		5.1	5	SN	3	C		20		
RAMY	02	1734	1736	1742	N11	W66	.926		28.8	8	SB	3	C		57		
RAMY	02	1742	1746	1812	S12	E16	.290		3.9	30	SB	3	C		83		
BIGB	02	1747	1754	1805	S32	E02	.438		2.9	18		1	C	1754	15		
RAMY	02	1825	1828	1835	N25	E74	.979		8.3	10	SN	3	C		28		
RAMY	02	1910	1911	2018	S20	E20	.405		4.3	68	SB	3	C		58		
RAMY	02	1915	1921	1933	N11	W67	.933		28.8	18	SB	3	C		28		
RAMY	02	1922	1946	2016	S12	E15	.275		3.9	54	SB	3	C		95		F
BIGB	02	2038	2043	2102	S31	E36	.668		5.6	24		2	C	2043	15		
RAMY	02	2051	2051	2055	S12	E14	.259		3.9	4	SB	3	C		45		
HOLL	02	2051	2051	2055	S13	E15	.281		4.0	4	SB	2	C		53		
HOLL	02	2057	2057	2103	S13	E15	.281		4.0	6	SN	2	C		22		
BIGB	02	2057	2100	2108	S19	E39	.644		5.8	11		2	C	2100	25		
BIGB	02	2103	2106	2115	N15	E45	.758		6.3	12		2	C	2106	20		
HOLL	02	2157	2159	2202	S12	E14	.259		4.0	5	SB	2	C		61		
RAMY	03	1235E	1237	1243	S33	E19	.532		4.9	8D	SN	2	C		33		H
MCMA	03	1440	1442	1451	S34	E18	.537	15740	5.0	11	SN		C	1442	40	.5	DH
MCMA	03	1535	1605	1658	S15	W48	.742	15733	31.0	83	1N		C	1605	125	7.0	E
MCMA	03	1600	1602	1611	N27	E65	.945	15750	8.5	11	SB		C	1602	50	1.5	E
RAMY	03	1605E	1608	1613	N28	E64	.942		8.5	8D	SN	2	C		17		
RAMY	03	1605E	1608	1652	S14	W47	.730		31.1	47D	SB	2	C		142		F
MCMA	03	1719	1721	1729	S13	W01	.120	15741	3.6	10	SN		C	1721	100	1.1	E
RAMY	03	1720	1721	1731	S12	E 3	.114		3.9	11	SB	2	C		62		
MCMA	03	1725	1731	1735	N27	E65	.945	15750	8.6	10	SF		C	1731	30	.9	D
RAMY	03	1804	1806	1809	N25	E61	.920		8.3	5	SN	2	C		21		
RAMY	03	1807	1809	1811D	S12	E 2	.108		3.9	4D	SB	2	C		87		
PALE	03	1810E	1810U	1823D	S12	E 1	.103		3.8	13D	SB	3	C		120		U F
MCMA	03	1818E		1836	S13	W01	.120	15741	3.7	18D	SN		C	1822	40	.4	E
RAMY	03	1902	1903	1905	S12	E 2	.108		3.9	3	SB	3	C		25		
PALE	03	2149E	2152U	2255D	S12	W 1	.103		3.8	66D	SB	3	C		90		FDE
RAMY	04	1145E	1150	1204D	N16	W77	.983		29.7	19D	SN	2	C		39		
MCMA	04	1418	1420	1425D	S15	E66	.908	15748	9.5	7D	SN		C	1420	60	1.5	E
MCMA	04	1948	1950	1955D	N17	W88	1.000	15726	29.2	7D	SN		P	1950			
HOLL	04	1951	1951	1957	N17	W82	.995		29.7	6	SN	3	C		0		
HOLL	04	2222	2222	2228	S17	E57	.836		9.2	6	SN	2	C		31		
HOLL	04	2228	2232	2244	S17	E57	.836		9.2	16	SN	2	C		52		F
HOLL	04	2246	2257	2307	S17	E57	.836		9.2	21	SN	2	C		29		F
MANI	05	0114E	0115U	0130	S34	W 1	.465		5.0	16D	SN	3	C		30		F
MANI	05	0114E	0115U	0123	S11	W10	.190		4.3	9D	SN	3	C		25		
RAMY	05	1826	1851U	2001	S35	W18	.547	15740	4.4	95	1B	3	C		417		F
MCMA	05	1833E		1913D	S37	W16	.559	15740	4.6	40D	1B		C	1841	175	2.2	E
PALE	05	1836E	1836U	1930D	S35	W17	.540	15740	4.5	54D	1B	2	C		267		
RAMY	05	1904	1904	1910	S20	W42	.682		2.6	6	SN	3	C		23		
RAMY	05	1926	1927	1935	S16	E47	.732		9.3	9	SN	2	C		68		
PALE	05	2309	2309	2313	N15	W35	.652		3.3	4	SN	3	C		18		F
PALE	06	0012	0021	0056	S22	W49	.763		2.3	44	SN	3	C		70		U
MANI	06	0015E	0018	0033D	S23	W60	.866		1.5	18D	SB	3	C		100		U
MCMA	06	1535E		1620	S13	W37	.602	15741	3.9	45D	SF		C	1546	40	.5	E
BIGB	06	1746	1751	1757	N17	E70	.956		12.0	11	SN	3	C	1751	75		D
RAMY	06	2056E	2111	2125D	N26	W50	.851		3.1	29D	SF	2	C		32		
RAMY	06	2056E	2056U	2109	S20	W78	.973		1.0	13D	SB	2	C		19		F
RAMY	06	2056E	2056U	2109	S20	W56	.828		2.7	13D	SN	2	C		22		
PALE	06	2115E	2115U	2135D	N26	E24	.641		8.7	20D	SN	1	C		40		F
BIGB	06	2125	2128	2140	N22	E25	.608		8.8	15	SN	3	C	2128	75		D
PALE	07	0202	0204	0211	N25	E20	.601		8.6	9	SN	3	C		56		DE
RAMY	07	1159E	1313U	1314D	N26	W59	.912		3.1	75D	SB	2	C		50		
RAMY	07	1221	1221	1221D	N12	E 8	.343		8.1		SN	2	C		41		
RAMY	07	1314	1315	1328	N12	E 8	.343		8.2	14	SN	2	C		88		
RAMY	07	1330	1344	1442	N26	W59	.912		3.1	72	SN	3	C		26		

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JAN	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
RAMY	07	1330	1340	1404D	N12	E 7	.337		8.1	34D	SN	2	C		64		
RAMY	07	1753	1800	1806	N12	E 5	.327		8.1	13	SB	3	C		43		F
RAMY	07	1845	1854	1934	N19	E10	.458		8.5	49	SN	3	C		73		F
PALE	07	1851	1905	1915	N25	E11	.547		8.6	24	SN	3	C		49		D+
RAMY	07	2032	2036	2039	N23	E14	.536		8.9	7	SB	3	C		25		
HOLL	07	2233	2233	2237D	N23	E71	.967		13.3	4D	SF	2	C		0		
BIGB	07	2303E	2303U	2303D	N26	E67	.954		13.0			2	P				
BIGB	07	2304E	2304	2304D	N11	E67	.933		13.0			2	P				
PALE	08	0229	0234	0236D	N17	E47	.788	15754	11.6	7D	1B	3	C		121		F
BIGB	08	1548E	1548	1548D	N17	E57	.875		12.9			1	P				
BIGB	08	1754	1757	1808	N12	W03	.321		8.5	14		1	P	1757	20		
BIGB	08	1754	1829	1839	N18	E56	.870		12.9	45		1	P	1829	10		
MCMA	08	1755E		1802D	N11	W04	.308	15749	8.4	7D	SN		P	1756	50	.5	D
BIGB	08	1843	1844	1846	S17	E19	.364		10.2	3		2	C	1844	10		
BIGB	08	1919	1924	1932	N08	W04	.259		8.5	13		1	C	1924	60		
BIGB	08	1954	2020	2143	N25	E80	.994		14.8	109		1	P	2020	15		
BIGB	08	2010	2030	2110	N09	W07	.292		8.3	60		2	C	2030	60		
BIGB	08	2025	2151	2223	N15	W80	.991		2.9	118		2	C	2151	25		
BIGB	08	2035	2133	2147	N15	E54	.845		12.9	72		2	C	2133	60		
BIGB	08	2118	2135	2143	N09	W07	.292		8.4	25		2	C	2135	60		
BIGB	08	2145	2153	2227	N07	W06	.254		8.5	42		1	C	2153	120		
BIGB	08	2232	2236	2254	N15	W80	.991		2.9	22		1	C	2236	25		
BIGB	08	2305	2315	2335	N07	W06	.254		8.5	30		1	C	2315	120		
BIGB	08	2307	2330	2350	N16	E53	.839		12.9	43		3	C	2330	30		
RAMY	09	1528	1533	1546	N15	E39	.698		12.6	18	SN	3	C		119		F
RAMY	09	1531	1538	1547	N22	E42	.767		12.8	16	SN	3	C		83		F
RAMY	09	1539	1541	1551	N 9	W18	.402		8.3	12	SN	3	C		32		
RAMY	09	1625	1627	1632	N 9	W19	.415		8.3	7	SN	3	C		40		F
RAMY	09	1634	1634	1639	N 9	W19	.415		8.3	5	SN	3	C		23		
RAMY	09	1752	1753	1802	S34	W68	.928		4.6	10	SB	3	C		17		
RAMY	09	1755	1756	1804	N 9	W20	.427		8.2	9	SB	3	C		27		
RAMY	09	1906	1912	1917	N 9	W20	.427		8.3	11	SB	2	C		57		F
RAMY	09	2008	2009	2053D	S34	W70	.938		4.6	45D	SB	2	C		35		F
RAMY	09	2023	2031	2053D	N 9	W21	.439		8.3	30D	SB	2	C		47		F
HOLL	09	2024	2026	2031	S35	W69	.934		4.7	7	SN	2	C		39		
HOLL	09	2024	2025	2032	N 8	W18	.392		8.5	8	SN	2	C		47		
ISTA	10	0725		0732	N18	E36	.685		13.0	7	SN						D
ISTA	10	0840		0846	N08	W29	.536		8.2	6	SF						D
RAMY	10	1453	1454	1504D	N17	E13	.452		11.6	11D	SN	3	C		44		F
RAMY	10	1546	1546	1603	N 8	W33	.588		8.2	17	SB	3	C		24		F
RAMY	10	1616	1621	1649	N 8	W33	.588		8.2	33	SB	3	C		117		
MCMA	10	1618E		1659D	N09	W35	.618	15749	8.1	41D	SN		C	1626	30	.4	D
HOLL	10	1628E	1628U	1634	N 9	W31	.568		8.4	6D	SN	2	C		30		F
RAMY	10	1754	1758	1804	N 8	W33	.588		8.3	10	SN	3	C		30		F
BIGB	10	1845	1852	1918	N15	W37	.676		8.0	33		2	C	1852	50		
MCMA	10	1848E	1852	1915D	N09	W35	.618	15749	8.2	27D	SN		C	1852	80	1.1	E
RAMY	10	1849	1851	2020D	N 8	W34	.601		8.2	91D	SB	2	C		57		
HOLL	10	1851	1851	1924	N 9	W33	.593		8.3	33	SB	2	C		36		
BIGB	10	1943	1956	1959	S23	E70	.934		16.1	16		2	C	1956	120		
BIGB	10	1954	1959	2009	S15	E36	.592		13.5	15		2	C	1959	30		
BIGB	10	2025	2036	2037	S23	E70	.934		16.1	12		2	C	2036	100		
BIGB	10	2035	2102	2145	N15	W37	.676		8.1	70		3	C	2102	40		
BIGB	10	2039	2044	2057	S24	E64	.896		15.7	18		3	C	2044	25		
BIGB	10	2040	2052	2102	S24	E63	.889		15.6	22		2	C	2052	25		
BIGB	10	2056	2101	2143	N19	W16	.501		9.7	47		1	C	2101	130		
BIGB	10	2059	2116	2126	N03	E17	.334		12.1	27		1	C	2116	80		
BIGB	10	2125	2135	2143	S23	E63	.888		15.6	18		3	C	2135	20		
BIGB	10	2156	2157	2209	S12	W16	.287		9.7	13		3	C	2157	30		
BIGB	10	2159	2200	2203	S23	E66	.909		15.9	4		3	C	2200	65		
BIGB	10	2201	2204	2209	S22	E62	.880		15.6	8		3	C	2204	20		
BIGB	10	2247	2300	2309	S23	E61	.873		15.5	22		3	C	2300	30		
BIGB	10	2337	2343	2352	N16	W37	.682		8.2	15		3	C	2343	65		
BIGB	10	2352	2358	2358D	S23	E60	.865		15.5	6D		2	P	2358	20		
MANI	11	0743E	0748	0751D	S19	W26	.472	15746	9.4	8D	1B	3	C		220		Z F
MANI	11	0746E	0748	0802D	N 9	W41	.692	15749	8.2	16D	1B	3	V		150		Z F
RAMY	11	1200E	1200U	1220	N15	E15	.442		12.6	20D	SN	3	C		32		
RAMY	11	1203	1203	1218	S24	E54	.814		15.6	15	SN	3	C		32		
RAMY	11	1219	1219	1236	S24	E57	.841		15.8	17	SN	3	C		22		

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION — MIN.	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JAN	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY			COND.	TYPE	TIME — UT	MEAS. AREA Millionths of Disk	CORR. AREA Sq. Deg.	
RAMY	11	1219	1239	1334	S18	W28	.493		9.4	75	SB	3	C		152		DE
RAMY	11	1305	1306	1337	N15	E14	.434		12.6	32	SN	3	C		22		
MCMA	11	1405	1406	1415	N08	W47	.756	15749	8.1	10	SN		C	1406	80	1.3	E
MCMA	11	1425E	1440	1448	N17	E19	.503	15745	13.0	23D	SN		C	1440	80	.9	E
RAMY	11	1429	1431	1455	N15	E13	.425		12.6	26	SB	2	C		61		
MCMA	11	1433	1446	1500D	N08	W47	.756	15749	8.1	22D	SN		C	1446	100	1.6	E
MCMA	11	1555	1556	1600D	S19	W26	.472	15748	9.7	5D	SF		C	1556	50	.6	E
RAMY	11	1556	1601	1606	N15	E13	.425		12.6	10	SB	3	C		21		
RAMY	11	1557	1557	1600	S18	W30	.521		9.4	3	SB	3	C		25		
MCMA	11	1607	1608	1614	S19	W26	.472	15748	9.7	7	SF		C	1608	25	.3	D
RAMY	11	1608	1608	1612	S18	W30	.521		9.4	4	SB	3	C		24		
MCMA	11	1658	1700	1710	N17	E17	.485	15745	13.0	12	SF		C	1700	50	.6	E
MCMA	11	1738	1743	1755	N09	W50	.790	15749	8.0	17	SN		C	1743	65	1.1	E
RAMY	11	1739	1742	1748	N 8	W46	.745		8.3	9	SB	3	C		50		
MCMA	11	1832		1840D	N17	E17	.485	15754	13.0	8D	SF		P	1839	35	.4	D
RAMY	11	1841	1842	1918	N15	E11	.410		12.6	37	SB	3	C		68		
RAMY	11	1925	1926	1933	N15	E11	.410		12.6	8	SN	3	C		22		
MCMA	11	1957	1958	2004	N08	W50	.788	15749	8.1	7	SN		C	1958	50	.8	E
RAMY	11	1957	1957	1959D	N 8	W48	.767		8.2	2D	SN	3	C		18		
RAMY	11	2041	2046	2111	N15	E10	.403		12.6	30	SB	3	C		103		H
RAMY	11	2122	2123	2124	N15	E10	.403		12.6	2	SN	2	C		24		
BIGB	11	2227	2235	2244	N17	E02	.402		12.1	17	SN	3	C	2235	140		EK
MANI	12	0028E	0030	0035D	S18	W37	.613	15748	9.2	7D	1B	3	V		180		U Z
RAMY	12	1328	1330	1349	N15	E 1	.378		12.6	21	SB	3	C		75		
RAMY	12	1415	1425	1430	N15	E 0	.369		12.6	15	SN	3	C		28		
MCMA	12	1513E	1529	1549D	S17	W43	.685	15748	9.4	36D	SN		C	1529	60	.9	E
MCMA	12	1518	1521	1539D	N16	E04	.391	15754	12.9	21D	SF		C	1521	90	1.0	E
RAMY	12	1628	1629	1633	N15	W 1	.370		12.6	5	SF	3	C		27		F H
RAMY	12	1746	1746	1751	N15	W 2	.371		12.6	5	SB	3	C		20		FDE
RAMY	12	1817	1817	1825	N15	W 2	.371		12.6	8	SB	3	C		27		FDE
RAMY	12	1841	1841	1846	S18	W44	.699		9.5	5	SB	3	C		22		FDE
RAMY	12	2000	2000	2009	N17	W17	.485		11.6	9	SN	3	C		23		
BIGB	12	2017	2026	2029	S18	W44	.699		9.5	12		2	C	2026	40		
RAMY	12	2024	2027	2033	S18	W45	.710		9.5	9	SB	3	C		27		
RAMY	12	2111E	2114	2123D	N17	W17	.485		11.6	12D	SB	2	C		141		FDE
BIGB	12	2112	2114	2123	N19	W10	.462		12.1	11		3	C	2114	130		
BIGB	12	2133	2142	2143	N16	E01	.386		13.0	10		3	C	2141	60		
BIGB	12	2150	2205	2207	N17	E02	.403		13.1	17		3	C	2205	65		
BIGB	12	2153	2157	2205	S17	W46	.720		9.5	12		2	C	2157	65		
BIGB	12	2208	2209	2211	N17	E02	.403		13.1	3		3	C	2209	65		
BIGB	12	2214	2226	2233	N16	E02	.387		13.1	19		3	C	2226	40		
BIGB	12	2248	2254	2301	N15	E01	.370		13.0	13		3	C	2254	65		
BIGB	12	2253	2255	2300	N16	W23	.532		11.2	7		1	C	2255	50		
MANI	13	0711E	0711U	0715	N13	W 2	.339		13.1	4D	SB	3	C		75		F
RAMY	13	1404E	1405U	1431	N14	W11	.398		12.8	27D	SB	3	C		77		
RAMY	13	1532	1538	1545	S26	E 1	.330		13.7	13	SN	3	C		31		
RAMY	13	1534	1542	1555	N14	W11	.398		12.8	21	SB	3	C		126		
RAMY	13	1614	1614	1626	N14	W12	.405		12.8	12	SB	3	C		38		
BIGB	13	1652	1657U	1702	N18	W08	.438		13.1	10		2	P	1657	15		
RAMY	13	1656	1657	1703	N17	W 8	.423		13.1	7	SB	3	C		38		F
BIGB	13	1705	1730	1737	N17	W09	.428		13.0	32		2	C	1730	15		
BIGB	13	1738	1738	1747	N18	W09	.443		13.1	9		2	C	1738	10		
BIGB	13	1816	1818	1833	S27	W58	.853		9.4	17		1	C	1818	30		
RAMY	13	1818	1819	1834	S17	W55	.815		9.6	16	SB	3	C		38		F
RAMY	13	1825	1835	1841	N17	W 9	.428		13.1	16	SB	3	C		42		F
BIGB	13	1834U	1912	1917U	N16	W12	.433		12.9	43U		1	P	1912	60		
RAMY	13	1902E	1912	1923D	N17	W11	.440		13.0	21D	SB	3	C		86		F
HOLL	13	1907	1910	1921	N15	W14	.435		12.7	14	SN	2	C		46		
BIGB	13	1916	1959	2100U	N15	W11	.412		13.0	104U		3	P	1959	50		
HOLL	13	1931	1933	2002	N15	W14	.435	15754	12.8	31	1B	2	C		230		F
RAMY	13	1936E	1936U	1938D	N17	W 9	.428	15754	13.1	2D	1B	3	C		464		F
HOLL	13	2046	2047	2051	S23	E33	.583		16.3	5	SN	3	C		71		
BIGB	13	2046	2047	2054	S24	E30	.553		16.1	8		3	C	2047	120		
BIGB	13	2134E	2134U	2137	N15	E05	.379		14.3	3D		2	P	2134	50		
BIGB	13	2134E	2134U	2138	N08	W80	.988		7.9	4D		2	P	2134	70		
BIGB	13	2230	2232	2237	N08	E60	.880		18.4	7		2	C	2232	50		
BIGB	13	2231	2237	2302	N08	E60	.880		18.4	31		2	C	2237	100		
HOLL	13	2236	2237	2306	S18	W56	.826		9.7	30	SB	3	C		34		FDE
BIGB	13	2237	2242	2254U	S22	E26	.490		15.9	17U		2	C	2242	50		
HOLL	13	2243	2244	2306	N 8	W76	.975		8.2	23	SN	3	C		0		

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	DATE JAN	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
BIGB	13	2245	2256	2305	S23	E22	.449		15.6	20		2	C	2256	50		
HOLL	13	2245	2245	2248	N15	W15	.444		12.8	3	SN	3	C		116		F
RAMY	14	1203E	1204U	1210	N14	W23	.513		12.8	7D	SB	2	C		26		
RAMY	14	1203E	1240	1259D	S14	W61	.869		9.9	56D	SF	3	C		33		
RAMY	14	1255	1258	1323	S18	W67	.914		9.5	28	SB	3	C		44		
RAMY	14	1444	1456	1502	N14	W24	.524		12.8	18	SB	3	C		46		
RAMY	14	1456	1457	1515	N14	W 6	.368		14.2	19	SN	3	C		64		
RAMY	14	1507	1507	1526	S24	W12	.354		13.7	19	SN	3	C		23		
RAMY	14	1542	1557	1616	S24	W13	.363		13.7	34	SN	3	C		53		F
RAMY	14	1609	1613	1630	N17	W41	.731		11.6	21	SB	3	C		130		F
HOLL	14	1610	1614	1630	N16	W45	.766		11.3	20	SN	2	C		88		
HOLL	14	1626	1638	1707	S16	W65	.900		9.8	41	SB	3	C		177		F
RAMY	14	1630	1631	1650	S24	W13	.363		13.7	20	SN	3	C		20		F
RAMY	14	1633	1638	1653	S18	W69	.927		9.5	20	SB	3	C		60		F
HOLL	14	1701	1702	1707	N15	W26	.555		12.8	6	SN	3	C		55		F
RAMY	14	1722	1724	1732	S24	W13	.363		13.7	10	SN	3	C		43		F
RAMY	15	1207	1210	1217	N14	W36	.661		12.8	10	SB	2	C		32		F
RAMY	15	1216	1217	1221	S17	W78	.973		9.7	5	SN	2	C		33		
RAMY	15	1227	1230	1243	S24	W27	.516		13.5	16	SB	3	C		37		F
RAMY	15	1319	1320	1324	S17	W79	.976		9.6	5	SN	3	C		11		
RAMY	15	1320	1321	1330	N14	W37	.672		12.8	10	SB	3	C		29		
RAMY	15	1327	1331	1342D	S17	W79	.976	15748	9.6	15D	1N	3	V		138		F
RAMY	15	1327	1340	1342D	S17	W79	.976	15748	9.6	15D	2B	3	V		244		F
RAMY	15	1332	1335	1343	S22	W 2	.264		15.4	11	SN	3	C		29		
RAMY	15	1349	1355	1425	S14	W47	.728	15756	12.1	36	1B	3	C		148		F
RAMY	15	1349	1355	1356D	N14	W37	.672	15754	12.8	7D	1B	3	V		148		F
MCMA	15	1349	1357	1422	N17	W36	.680	15754	12.9	33	SN		C	1357	90	1.2	E
RAMY	15	1351	1357	1400	S17	W79	.976		9.7	9	SN	3	C		28		
RAMY	15	1530	1532	1538	S18	W80	.980	15748	9.6	8	1B	3	C		115		F
RAMY	15	1531	1532	1540	N14	W38	.683		12.8	9	SN	3	C		22		
MCMA	15	1537E		1547D	S20	W85	.993	15748	9.3	10D	SF		P	1537			
RAMY	15	1550	1553	1652	S22	W 4	.270		15.4	62	SB	3	C		77		F
RAMY	15	2008	2010	2055	N14	W40	.705	15754	12.8	47	1B	3	C		336		DE
RAMY	15	2026	2026	2030	S17	W83	.989		9.6	4	SB	3	C		18		
RAMY	15	2100	2100	2114	S22	W 6	.280		15.4	14	SN	3	C		25		
MANI	16	0738	0741	0755	N15	W47	.782	15754	12.8	17	1B	3	C		280		
ISTA	16	0848	0851	0925	S22	W13	.336		15.4	37	SB						K
ISTA	16	0915	0920	0934	S21	W14	.335		15.3	19	SB						K
ISTA	16	0938	0953	1023	N17	E63	.918		21.1	45	SN						D
ISTA	16	0950	0954	1023	N16	E61	.903		21.0	33	SN						D
ATHN	16	1040E	1045	1055D	S15	W16	.304		15.2	15D	SN	1		1045	131	1.3	
RAMY	16	1222E	1223	1230D	N14	W49	.798		12.8	8D	SB	3	C		60		F
MCMA	16	1354	1400	1408	N21	E63	.926	15772	21.3	14	SN		C	1400	70	1.7	E
RAMY	16	1400E	1402	1409D	N17	E60	.898		21.1	9D	SB	3	C		33		
MCMA	16	1410	1417	1503D	N17	W50	.818	15754	12.8	53D	SN		C	1417	100	1.7	E
RAMY	16	1414E	1416	1455	N14	W49	.798		12.9	41D	SB	3	C		128		F H
MCMA	16	1536E	1543	1600D	N25	W51	.857	15754	12.8	24D	SF		C	1543	20	.4	D
MCMA	16	1554	1555	1558	N21	E71	.966	15772	22.0	4	SB		C	1555	40	1.6	DV
MCMA	16	1620	1624	1630	N15	W52	.829	15754	12.8	10	SF		C	1624	25	.5	D
RAMY	16	1621	1625	1632	N15	W51	.820		12.9	11	SB	3	C		28		F
MCMA	16	1631	1636	1650	N12	W43	.728	15773	13.5	19	SN		C	1636	50	.7	E
RAMY	16	1633	1633	1641	N11	W41	.701		13.6	8	SN	3	C		29		F
RAMY	16	1750	1758	1822D	S22	W18	.391		15.4	32D	SB	3	C		130		F
MCMA	16	1803E		1823	S21	W18	.381	15762	15.4	20D	SN		P	1803	60	.7	E
MCMA	16	1839	1845	1915	S15	W23	.406	15761	15.1	36	1B		C	1845	200	2.3	EH
PALE	16	1843	1843	1857	S15	W23	.406	15747	15.1	14	1B	3	C		330		F
MCMA	16	1853	1855	1905	N17	W51	.827	15754	13.0	12	SB		C	1855	50	1.0	E
PALE	16	1855	1856	1907	N15	W50	.811		13.0	12	SB	3	C		64		F
PALE	16	1938	1946	1959	S22	W16	.368		15.6	21	SB	3	C		49		F
MCMA	16	1948E	1956	2010D	S21	W18	.381	15762	15.5	22D	SB		C	1956	70	.8	E
MCMA	16	1958E	2000	2005D	N16	W53	.841	15754	12.9	7D	SF		P	2000	60	1.2	E
PALE	16	2102	2102	2112	N15	W54	.846		12.8	10	SN	3	C		31		DE
PALE	16	2140	2157	2211	N15	W55	.855	15754	12.8	31	1B	3	C		154		DE
PALE	16	2217	2221	2223	N17	W53	.844		13.0	6	SN	3	C		42		
PALE	16	2224	2246	2310	N17	W53	.844	15754	13.0	46	2B	3	C		340		U F
PALE	16	2311	2311	2314	N17	W53	.844		13.0	3	SN	3	C		36		DE
PALE	17	0134	0135	0140	N15	W56	.863		12.9	6	SN	3	C		30		
PALE	17	0233	0234	0236	N15	W57	.871		12.8	3	SN	3	C		21		

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JAN	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
PALE	17	0241	0244	0247	S22	W18	.391		15.8	6	SN	3	C		72		DE
RAMY	17	1317E	1317U	1320	N15	W63	.915		12.8	30	SN	2	C		14		
RAMY	17	1317E	1318	1327	S15	E51	.773		21.4	100	SN	2	C		33		
RAMY	17	1326	1334	1400	N15	W63	.915		12.8	34	SN	2	C		14		
RAMY	17	1427	1428	1440	S15	E51	.773		21.4	13	SB	3	C		34		
RAMY	17	1451	1452	1501	N15	W64	.921		12.8	10	SN	3	C		22		
RAMY	17	1527	1527	1618	N15	W64	.921		12.8	51	SB	3	C		14		
RAMY	17	1617	1617	1636	N17	E46	.781		21.1	19	SB	3	C		69		
RAMY	17	1832	1833	1848D	N15	W66	.933		12.8	160	SN	3	C		17		
PALE	17	1841	1847	1928	N15	W66	.933		12.8	47	SN	3	C		35		DE
PALE	17	1922	1922	1936	S22	W27	.501		15.8	14	SN	3	C		20		F
RAMY	17	2003	2010	2038	N15	W67	.939		12.8	35	SB	3	C		19		
PALE	17	2049	2059	2138	N15	W67	.939	15754	12.8	49	1N	3	C		180		DE
RAMY	18	1215	1215	1219	N15	W75	.976		12.9	4	SN	2	C		18		
RAMY	18	1237	1237	1240	N15	W75	.976		12.9	3	SN	2	C		15		
RAMY	18	1237	1238	1243	S15	E42	.668		21.7	6	SN	2	C		22		
RAMY	18	1245	1249	1256	N15	W76	.980		12.8	11	SB	3	C		45		
RAMY	18	1246	1246	1248	S15	E42	.668		21.7	2	SN	2	C		22		
RAMY	18	1343	1354	1407	S15	E41	.656		21.6	24	SB	3	C		99		
RAMY	18	1416	1418	1422	N15	W76	.980		12.9	6	SB	3	C		35		
RAMY	18	1431	1431	1459	S15	E40	.643		21.6	28	SN	3	C		30		
RAMY	18	1517	1527	1641	S15	E39	.630		21.6	84	SB	3	C		119		F
MCMA	18	1525	1528	1540	S15	E43	.681	15774	21.9	15	SN		C	1528	50	.7	E
MCMA	18	1631	1635	1640	S23	W03	.281	15767	18.5	9	SF		C	1635	30	.3	D
RAMY	18	1634	1635	1642	S23	W 1	.277		18.6	8	SN	3	C		37		
RAMY	18	1759	1813	1822	S15	E38	.617		21.6	23	SB	3	C		52		
HOLL	18	1805	1807	1821	S15	E39	.630	15774	21.7	16	1N	3	C		189		F
PALE	18	1812	1813	1826	S11	E39	.625		21.7	14	SB	3	C		41		DE
MCMA	18	1815E		1820	S23	W03	.281	15767	18.5	50	SF		P	1818	30	.3	D
RAMY	18	1823	1823	1825	S15	E38	.617		21.6	2	SN	3	C		35		
PALE	18	1831	1832	1900	S11	E39	.625		21.7	29	SN	3	C		35		
RAMY	18	1835	1841	1845	S24	W42	.691		15.6	10	SN	3	C		41		
RAMY	18	1851	1851	1857	S23	W 3	.281		18.6	6	SF	3	C		31		
HOLL	18	1852	1855	1858	N14	W84	.997		12.5	6	SN	3	C		0		
RAMY	18	1854	1856	1905	N15	W79	.988		12.9	11	SN	3	C		30		
RAMY	18	1923	1924	1928	N15	W79	.988		12.9	5	SN	3	C		0		
PALE	18	1943	1957	2101	S11	E38	.612		21.7	78	SB	3	C		109		F
MCMA	18	1950	1952	2014D	S15	E41	.656	15774	21.9	240	SN		C	1952	40	.6	E
RAMY	18	1951	1957	2023	S15	E37	.604		21.6	32	SB	3	C		43		
RAMY	18	2001	2002	2007	N15	W80	.991		12.8	6	SN	3	C		0		
RAMY	18	2012	2025	2042	S23	W 4	.284		18.5	30	SN	3	C		68		
RAMY	18	2041	2041	2046	S15	E37	.604		21.6	5	SN	3	C		18		
RAMY	18	2041	2041	2048	N11	E69	.945		24.0	7	SF	3	C		16		
PALE	18	2107	2107	2117	S11	E38	.612		21.7	10	SN	3	C		21		
PALE	18	2116	2117	2118	N 9	W73	.963		13.4	2	SN	3	C		22		
PALE	19	0154	0155	0157	N15	W89	1.090		12.4	3	SB	3	C		0		F
PALE	19	0226	0229	0238	N18	E36	.688		21.8	12	SB	3	C		44		FDE
PALE	19	0239	0240	0247	N12	E72	.962		24.5	8	SN	3	C		15		DE
RAMY	19	1217	1217	1223	N18	E24	.565		21.3	6	SN	3	C		20		
RAMY	19	1257	1258	1308	N11	E60	.886		24.0	11	SN	3	C		15		
RAMY	19	1308	1308	1334	S10	E49	.749		23.2	26	SN	3	C		20		
RAMY	19	1338	1341	1420	S24	W52	.794		15.7	42	SB	3	C		137		FDE
RAMY	19	1348	1353	1400	S22	W14	.345		18.5	12	SN	3	C		35		
RAMY	19	1424	1428	1455	S24	W53	.804		15.6	31	SN	3	C		39		
RAMY	19	1551	1553	1556D	N11	E58	.870		24.0	5D	SB	3	C		20		
RAMY	19	1556	1557	1620	N18	E20	.528		21.2	24	SN	3	C		30		F
HOLL	19	1603	1604	1610	N18	E21	.537		21.2	7	SN	3	V		28		
BIGB	19	1832	1833	1845	S19	W60	.861		15.3	13		3	C	1833	60		
PALE	19	1914	1915	1924	S23	W16	.378		18.6	10	SN	3	C		34		
BIGB	19	2001	2008	2015	N10	E63	.906		24.6	14		3	C	2008	70		
PALE	19	2004	2007	2012	N12	E60	.888		24.3	8	SN	3	C		36		
BIGB	19	2108		2142D	N20	W17	.526		18.6	34D		3	C	2142	120		
BIGB	19	2110	2129	2140	S29	E38	.669		22.7	30		3	C	2129	70		
PALE	19	2111	2136	2214	N18	E19	.519		21.3	63	SB	3	C		94		DE
HOLL	19	2112	2133	2142D	N19	E20	.539		21.4	30D	SN	2	C		80		F
HOLL	19	2112	2117	2142D	N19	E20	.539		21.4	30D	SF	2	C		35		F
HOLL	19	2114E	2122U	2134D	S18	E38	.624		22.7	20D	SN	2	C		20		F
PALE	19	2115	2125	2137	S18	E37	.611		22.7	22	SN	3	C		29		DE
BIGB	19	2123	2128	2140	N13	W24	.517		18.1	17		3	C	2128	30		
BIGB	19	2128	2129	2131	S12	E90	1.000		26.6	3		3	C	2129	10		

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JAN	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		CORD.	TYPE	TIME UT	MEAS. AREA Mill. of Dia.	CORR. AREA Sq. Deg.	
PALE	19	2222	2226	2228	N18	E19	.519		21.4	6	SN	3	C		32		DE
BIGB	19	2228	2239	2325	S16	E19	.353		21.4	57		2	C	2239	150		
PALE	19	2231	2241	2344	N18	E18	.510	15772	21.3	73	1B	3	C		222		FD+
BIGB	19	2232	2233	2234	S13	E90	1.000		26.7	2		3	C	2233	25		
BIGB	19	2237	2244	2248	N10	E61	.892		24.5	11		3	C	2244	120		
BIGB	19	2240	2246	2313	N13	E23	.505		21.7	33		2	C	2246	60		
PALE	19	2240	2240	2251	N10	E67	.933		25.0	11	SN	3	C		21		DE
RAMY	20	1207	1207U	1207D	S22	W70	.933		15.3		SN	2	C		89		
BIGB	20	1644E	1644U	1650	S14	E90	1.000		27.4	6D		1	C	1644	50		
BIGB	20	1712	1716	1723	N14	E52	.826		24.6	11		1	C	1716	15		
BIGB	20	1712	1717	1724	N16	E71	.961		26.0	12		1	C	1717	40		
PALE	20	2036	2037	2042	N15	E 5	.384		21.2	6	SN	2	C		22		DE
BIGB	20	2119	2122	2130	N19	E09	.461		21.6	11		1	C	2122	10		
BIGB	20	2137	2139	2147U	S19	E90	.999		27.7	10U		1	P	2139	30		
BIGB	20	2331	2332	2333	S19	W76	.964		15.3	2		1	C	2332	15		
PALE	21	0210	0211	0214	S26	E35	.620		23.7	4	SN	3	C		23		DE
RAMY	21	1220	1233	1246	N18	E58	.887		25.9	26	SN	3	C		24		
RAMY	21	1225	1226	1231	N12	E37	.662		24.3	6	SN	3	C		19		H
RAMY	21	1235	1237	1300	N17	E 3	.410		21.7	25	SB	3	C		58		F
RAMY	21	1241	1244	1247	S26	E30	.563		23.8	6	SN	3	C		20		
RAMY	21	1312	1314	1332	S22	W85	.992		15.2	20	SB	3	C		0		F
RAMY	21	1511	1514	1535	N17	W 2	.409	15774	21.5	24	1B	3	C		438		F
RAMY	21	1554	1600	1607	N17	W 2	.409		21.5	13	SB	3	C		103		F
RAMY	21	1611	1612	1628	N17	W 1	.408		21.6	17	SN	3	C		49		F
RAMY	21	1620	1621	1624	N 9	E39	.670		24.6	4	SN	3	C		31		
RAMY	21	1731	1731	1739	N17	W 4	.413		21.4	8	SN	3	C		43		
RAMY	21	1740	1740	1817	N17	W 4	.413		21.4	37	SN	3	C		45		
RAMY	21	1751	1758	1802	N12	E34	.627		24.3	11	SN	3	C		40		
RAMY	21	1813	1814	1821	N18	E54	.856		25.8	8	SN	3	C		22		
RAMY	21	1912	1912	1918	S15	E64	.892		26.6	6	SN	3	C		14		F
RAMY	21	2026	2027	2055	S26	E25	.507		23.7	29	SN	3	C		68		
PALE	21	2110E	2110U	2122	N13	E34	.633		24.4	12D	SN	3	C		78		DE
PALE	21	2136	2137	2212D	N18	W 6	.434		21.5	36D	SB	3	C		87		DE
BIGB	21	2148	2149	2151	N15	E30	.602		24.2	3		2	C	2149	40		
BIGB	21	2154	2156	2205	S13	E61	.868		26.5	11		2	C	2156	30		E
BIGB	21	2253	2255	2258	S15	E67	.914		27.0	5		1	C	2255	50		
BIGB	21	2256	2303	2312	S12	E60	.860		26.5	16		3	C	2303	15		E
BIGB	21	2311	2315	2323	S18	E75	.959		27.6	12		3	C	2315	40		
PALE	22	0144E	0144U	0157	S35	W12	.500		21.2	13D	SN	3	C		43		DE
RAMY	22	1146	1147	1206	N18	E45	.777		25.9	20	SB	3	C		27		
RAMY	22	1148	1149	1214	N 9	E28	.533		24.6	26	SN	3	C		36		
RAMY	22	1213	1220	1245	N18	E44	.768		25.8	32	SB	3	C		60		F
RAMY	22	1214	1216	1240	S26	E17	.421		23.8	26	SN	3	C		22		
RAMY	22	1229	1232	1236	N 9	E27	.520		24.5	7	SB	3	C		24		
RAMY	22	1243	1244	1249	S24	E67	.915		27.6	6	SN	3	C		14		
RAMY	22	1248	1254	1307	N12	E24	.508		24.3	19	SN	3	C		57		
RAMY	22	1251	1257	1310	N 9	E27	.520		24.6	19	SN	3	C		34		
RAMY	22	1253	1255	1302	N18	E44	.768		25.8	9	SN	3	C		16		
RAMY	22	1353	1357	1407	S19	E 4	.217		22.9	14	SF	3	C		62		F
RAMY	22	1409	1413	1425	N 9	E26	.507		24.5	16	SB	3	C		113		F
RAMY	22	1417	1418	1423	N12	E23	.497		24.3	6	SB	3	C		108		
RAMY	22	1424	1425	1433	N18	E43	.758		25.8	9	SN	3	C		20		
RAMY	22	1452	1505	1602	S16	E56	.823		26.8	70	SB	3	C		119		F
MCMA	22	1454E		1527D	S16	E60	.860	15785	27.1	33D	1B		C	1504	100	2.1	E
RAMY	22	1508	1512	1518	S24	E66	.908		27.6	10	SN	3	C		16		
RAMY	22	1535	1537	1554	N 9	E26	.507		24.6	19	SN	3	C		28		
RAMY	22	1535	1539	1551	N12	E23	.497		24.4	16	SN	3	C		43		
RAMY	22	1558	1607	1625	N 9	E25	.495		24.5	27	SN	3	C		26		
BIGB	22	1632	1644	1804	N14	E27	.560		24.7	92		2	C	1644	220		
RAMY	22	1633	1637	1716	N 8	E25	.487		24.6	43	SB	3	C		102		F
RAMY	22	1634	1637	1725	N12	E22	.485		24.3	51	SB	3	C		37		F
BIGB	22	1753	1812	1840	S16	E64	.892		27.5	47		3	C	1812	60		
RAMY	22	1756	1757	1805	N17	W17	.490		21.5	9	SB	3	C		88		DE
BIGB	22	1756	1758	1803	N17	W20	.517		21.2	7		3	C	1758	60		
BIGB	22	1816	1819	1824	S24	E80	.978		28.8	8		3	C	1819	30		
BIGB	22	1821	1823	1843	N17	W13	.458		21.8	22	SN	3	C	1823	130		
RAMY	22	1822	1824	1843	N17	W17	.490		21.5	21	SB	3	C		117		DE
BIGB	22	1823	1823	1907	S14	E57	.832		27.0	44	SN	3	C	1823	150		K
RAMY	22	1823	1824	1910	S16	E54	.804		26.8	47	SB	3	C		115		

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JAN	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		CORD.	TYPE	TIME — UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
RAMY	22	1854	1927	1931	N12	E22	.485		24.4	37	SN	3	C		54		
BIGB	22	1924	1926	1928	N21	W24	.597		21.0	4	SN	3	C	1926	10		
RAMY	22	1932	1932	1937	N17	W18	.499		21.5	5	SB	3	C		45		
PALE	22	1932	1932	1936	N18	W17	.503		21.5	4	SN	2	C		49		
BIGB	22	2016	2018	2035	S14	E11	.222		23.7	19	SN	3	C	2018	100		F
PALE	22	2016	2019	2020	S12	E10	.191		23.6	4	SN	2	C		20		
BIGB	22	2020	2023	2025	N17	W18	.499		21.5	5		3	C	2023	15		
BIGB	22	2022	2024	2034	N10	E26	.515		24.8	12	SN	3	C	2024	100		E
BIGB	22	2129	2132	2140	S14	E11	.222		23.7	11		3	C	2132	40		
BIGB	22	2137	2139	2144	N21	W11	.501		22.1	7		3	C	2139	30		
PALE	22	2140	2141	2143	N18	W18	.511		21.6	3	SB	2	C		45		DE
BIGB	22	2146	2155	2215	N20	W12	.493		22.0	29		3	C	2155	10		
BIGB	22	2158	2207	2216	S16	E57	.833		27.2	18		3	C	2207	50		
BIGB	22	2159	2210	2220	N20	E45	.787		26.3	21		3	C	2210	50		
PALE	23	0006	0007	0013	N 8	E20	.423		24.5	7	SB	3	C		62		DE
PALE	23	0047	0054	0059	S25	E59	.857		27.5	12	SN	3	C		27		DE
PALE	23	0135	0136	0138	N18	W20	.529		21.6	3	SN	3	C		29		DE
MANI	23	0635E	0635U	0643	N19	W16	.507		22.1	8D	SN	3	C		50		
MANI	23	0639	0640	0647	N12	E15	.410		24.4	8	SN	3	C		50		
RAMY	23	1537	1540	1557	S23	E63	.886		28.4	20	SN	3	C		21		
RAMY	23	1540	1541	1545	S23	W67	.914		18.6	5	SN	3	C		23		
RAMY	23	1618	1618	1625	S26	E49	.769		27.4	7	SB	3	C		19		
RAMY	23	1645	1646	1656	S12	W 2	.092		23.5	11	SN	3	C		30		
BIGB	23	1718	1727	1740	S14	E38	.615		26.6	22		1	C	1727	40		
RAMY	23	1728	1729	1737	N18	E29	.617		25.9	9	SN	3	C		19		
RAMY	23	1732E	1732U	1748	S16	E36	.592		26.4	16D	SN	3	C		46		
RAMY	23	1751	1756	1908	S16	E36	.592		26.4	77	SB	3	C		97		
BIGB	23	1755	1756	1805	S15	E38	.617		26.6	10		2	C	1756	50		
PALE	23	1757	1759	1812	S14	E37	.602		26.5	15	SB	3	C		90		DE
RAMY	23	1806	1806	1815	S26	E48	.759		27.4	9	SN	3	C		46		
RAMY	23	1806	1808	1808	N18	E28	.606		25.9	2	SN	3	C		47		
PALE	23	1820	1821	1823	S14	E37	.602		26.5	3	SN	3	C		43		DE
PALE	23	1836	1837	1858	S14	E36	.588		26.5	22	SN	3	C		37		DE
BIGB	23	2006	2007	2017	N11	E24	.500		25.6	11		3	C	2007	50		
PALE	23	2012E	2012U	2016	N19	E28	.615		25.9	4D	SB	3	C		52		DE
BIGB	23	2031	2034	2043	S10	W04	.085		23.6	12		3	C	2034	70		
PALE	23	2032	2034	2043	S12	W 3	.100		23.6	11	SB	3	C		115		DE F
BIGB	23	2204	2218	2234	S32	E75	.959		1.5	30		3	C	2218	50		
PALE	23	2212	2212	2216	N12	E 5	.338		24.3	4	SN	3	C		53		
PALE	23	2333	2334	2337	S14	E34	.561		26.5	4	SN	3	C		52		
PALE	24	0015	0016	0018	S25	E46	.736		27.5	3	SB	3	C		18		DE
PALE	24	0137	0148	0206	N12	E 3	.332	15777	24.3	29	1B	3	C		258		FD+
PALE	24	0143	0144	0156	N 8	E 6	.280		24.5	13	SB	3	C		43		
PALE	24	0219	0223	0232	S14	E32	.532		26.5	13	SN	3	C		19		DE
MANI	24	0818E	0818U	0831D	S13	E30	.501		26.6	13D	SN	3	C		40		F
RAMY	24	1129E	1131	1157	S16	E26	.453		26.4	28D	SN	2	C		90		
RAMY	24	1134	1134	1137	N18	E19	.520		25.9	3	SN	2	C		41		
RAMY	24	1232E	1232U	1236D	S16	E26	.453	15785	26.5	4D	1B	2	C		418		DE
RAMY	24	1243	1245	1255	S26	E38	.653		27.4	12	SN	2	C		105		
RAMY	24	1249E	1249	1315	N12	W 1	.328	15777	24.5	26D	1B	2	C		254		DE
RAMY	24	1520	1522	1527	N12	W 3	.332		24.4	7	SB	2	C		29		
RAMY	24	1713E	1715U	1728	S26	E34	.608		27.3	15D	SB	3	C		89		H
RAMY	24	1903	1905	1914	N12	W 5	.338		24.4	11	SB	3	C		123		
PALE	24	1903E	1903U	1919D	N12	W 7	.348		24.3	16D	SN	3	C		56		DE
RAMY	24	1912	1914	1928	S16	E22	.395	15785	26.5	16	1B	3	C		314		
RAMY	24	1915	1917	1922	S26	E35	.620		27.4	7	SN	3	C		26		
PALE	24	1918E	1918U	1926	S14	E23	.401		26.5	8D	SB	3	C		155		DE F
RAMY	24	1930	1932	1935	S16	E22	.395		26.5	5	SN	3	C		33		
RAMY	24	2001	2005	2019	S12	W17	.300		23.6	18	SB	3	C		48		
PALE	24	2006	2006	2011	S12	W16	.284		23.6	5	SN	3	C		28		DE F
PALE	24	2055	2055	2118	S26	W14	.392		23.8	23	SN	3	C		44		DE
PALE	25	0222	0223	0228	S14	E21	.370		26.7	6	SN	3	C		32		DE
PALE	25	0318	0324	0325D	S14	E20	.355	15785	26.6	7D	1B	3	V		226		
MANI	25	0325E	0325U	0336D	S14	E20	.355		26.6	11D	SB	3	C		100		FDE
RAMY	25	1154	1156	1225	S26	E25	.506		27.4	31	SB	3	C		170		
RAMY	25	1221	1231	1316	S14	E12	.236		26.4	55	SB	3	C		48		
RAMY	25	1340	1340	1400	S14	E12	.236		26.5	20	SN	3	C		20		
RAMY	25	1417	1418	1501	S26	E23	.483	15786	27.3	44	1B	3	C		465		FDE
BIGB	25	1940	1943	1952	S21	E88	.997		4.4	12		3	C	1943	200		D

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IM-POR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JAN	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
RAMY	25	2010	2022	2129	S14	E 9	.194		26.5	79	SB	3	C		178		F
PALE	25	2012	2021U	2028D	S14	E11	.221		26.7	16D	SB	3	C		144		F
PALE	25	2137	2137	2234	S14	E10	.207		26.7	57	SN	3	C		22		DE
PALE	25	2251	2301	0020	S14	E22	.385		27.6	89	SB	3	C		80		DE
PALE	25	2316	2316	2352	S14	E 9	.194		26.6	36	SN	3	C		54		DE
RAMY	26	1143	1144	1156	S14	W 1	.120		26.4	13	SB	3	C		99		
RAMY	26	1143	1151	1156	S14	W 1	.120		26.4	13	SN	3	C		24		
RAMY	26	1424	1424	1428	N18	W 9	.449		25.9	4	SN	3	C		24		
RAMY	26	1429	1444	1517	S14	W 2	.124		26.5	48	SN	3	C		72		
RAMY	26	1431	1433	1435	N18	W 9	.449		25.9	4	SN	3	C		33		
BIGB	26	1752	1754	1800	N20	W05	.463		26.4	8		3	C	1754	20		
RAMY	26	1754E	1755	1812	N18	W11	.460		25.9	18D	SN	3	C		51		F
BIGB	26	1842	1843	1844	S28	E09	.383		27.5	2		1	C	1843	50		
BIGB	26	1921	1923	1924	S15	W70	.933		21.6	3		1	C	1923	30		
BIGB	26	2025	2047U	2114	S16	W04	.168		26.6	49		1	C	2047	260		
PALE	26	2025	2032	2220	S14	W 3	.129		26.6	115	SB	3	C		156		DE
BIGB	26	2126	2152	2235	S13	W03	.114		26.7	69		1	P	2152	50		
HANI	27	0833E	0835	0850D	N19	W16	.509		26.2	17D	SB	3	V		100		F U
RAMY	27	1554	1558	1559D	S14	W18	.325		26.3	5D	SB	3	C		50		F
HOLL	27	1558	1558	1603	S15	W15	.287		26.5	5	SB	2	C		36		
HOLL	27	1716	1716	1719	S27	W48	.761		24.1	3	SN	3	C		24		
HOLL	27	1716	1716	1722	N12	W46	.762		24.3	6	SN	3	C		48		F
RAMY	27	1719	1721	1734	N18	W24	.568		25.9	15	SN	3	C		19		
HOLL	27	1740	1741	1744	N 7	W45	.732		24.4	4	SN	3	C		30		
HOLL	27	1759	1800	1805	N18	W24	.568		25.9	6	SN	3	C		36		F
RAMY	27	1759	1759	1804	N18	W24	.568		25.9	5	SN	3	C		21		
RAMY	27	1819	1825	1831	N 8	W42	.701		24.6	12	SN	3	C		45		F
HOLL	27	1821	1822	1831	N 7	W45	.732		24.4	10	SN	3	C		36		F
HOLL	27	1835	1840	1858	N18	W24	.568		26.0	23	SB	3	C		71		F
RAMY	27	1838	1846	1912	N18	W25	.577		25.9	34	SB	3	C		91		F
HOLL	27	1839	1845	1855	S27	W49	.771		24.1	16	SN	3	C		26		F
HOLL	27	1844	1845	1849	S15	W17	.316		26.5	5	SN	3	C		31		
RAMY	27	1844	1845	1848	S14	W18	.325		26.4	4	SN	3	C		27		
HOLL	27	1848	1849	1905	N12	W47	.772		24.3	17	SB	3	C		62		FDE
RAMY	27	1849	1849	1912	N12	W44	.740		24.5	23	SB	3	C		59		DE
PALE	27	1856E	1856U	1900	N11	W48	.778		24.2	4D	SB	2	C		38		DE
HOLL	27	1859	1859	1903	N18	W24	.568		26.0	4	SN	3	C		68		F
RAMY	27	1923	1923	1932	N 8	W43	.713		24.6	9	SN	3	C		25		
HOLL	27	1923	1923	1927	N 7	W46	.743		24.4	4	SN	3	C		49		
RAMY	27	2033	2037	2102	N 8	W44	.724		24.6	29	SN	3	C		51		
PALE	27	2044	2045	2054	N11	W49	.788		24.2	10	SN	3	C		22		DE
PALE	27	2055	2055	2057	N11	W49	.788		24.2	2	SN	3	C		22		DE
PALE	27	2109	2112	2140	N11	W49	.788		24.2	31	SN	3	C		43		
PALE	27	2158	2159	2231	N11	W50	.798		24.2	33	SB	3	C		84		DE
HOLL	27	2159	2200	2222	N 7	W47	.754		24.4	23	SB	3	C		98		
HOLL	27	2205	2205	2215	N12	W49	.792		24.2	10	SB	3	C		48		
HOLL	27	2230	2240	2330	N18	W27	.597	15787	25.9	60	1B	3	C		313		U F
PALE	27	2239	2243	2251	N20	W26	.606		26.0	12	SB	3	C		87		FDE
ISTA	28	0820		0825	N08	W58	.864		24.0	5	SF						D
RAMY	28	1234	1243	1256	N 8	W53	.819		24.5	22	SN	3	C		21		
RAMY	28	1250	1252	1257	S14	W32	.532		26.1	7	SB	3	C		69		H
RAMY	28	1304	1309	1405	N12	W55	.848		24.4	61	SB	3	C		110		F
RAMY	28	1411	1414	1443	N12	W55	.848		24.5	32	SB	2	C		101		
RAMY	28	1420	1422	1428	N 7	E75	.971		6.2	8	SN	2	C		0		
RAMY	28	1427	1429	1456	N 8	W57	.856		24.3	29	SN	2	C		419		
RAMY	28	1427	1442	1456	N 8	W57	.856		24.3	29	SB	2	C		97		
RAMY	28	1504	1506	1508	N 7	E74	.967		6.2	4	SF	2	C		0		
RAMY	28	1544	1545	1548	N 9	E76	.976		6.4	4	SF	2	C		0		
RAMY	28	1733E	1734U	1735D	S14	W30	.503		26.5	2D	SB	2	C		42		
HOLL	28	1737E	1737U	1802	S15	W29	.492		26.6	25D	SB	3	C		73		
HOLL	28	1801	1811	1839	N 7	W58	.862		24.4	38	SN	3	C		55		F
HOLL	28	1804	1804	1835	S15	W29	.492		26.6	31	SB	3	C		44		F
HOLL	28	1905	1905	1912	S27	W61	.874		24.2	7	SN	3	C		14		F
HOLL	28	1906	1906	1917	S15	W29	.492		26.6	11	SN	3	C		20		F
RAMY	28	1949	1949	1953	N 7	E72	.957		6.2	4	SN	2	C		10		
RAMY	28	2002	2006	2011	N 8	W57	.856		24.6	9	SB	2	C		35		
PALE	29	0204	0208	0219	S18	E37	.610	15792	3.9	15	1B	3	V		219		U F
RAMY	29	1141	1145	1154	N18	W65	.933		24.6	13	SN	2	C		80		

Hα SOLAR FLARES

JANUARY 1979

OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JAN	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
RAMY	29	1148	1149	1153	S14	W40	.641		26.5	5	SB	3	C		50		
RAMY	29	1201	1201	1216	N18	W65	.933		24.6	15	SN	3	C		13		
RAMY	29	1202	1205	1215	S14	W40	.641		26.5	13	SB	3	C		59		
RAMY	29	1216	1217	1234	N18	W48	.806		25.9	18	SN	3	C		33		
RAMY	29	1218	1228	1240	N18	W65	.933		24.6	22	SN	3	C		53		
RAMY	29	1227	1229	1231	N 7	E62	.895		6.2	4	SN	3	C		16		
RAMY	29	1323	1324	1349	N18	W66	.939		24.6	26	SB	3	C		18		
RAMY	29	1338	1338	1343	N 8	W66	.924		24.6	5	SN	2	C		23		
RAMY	29	1437	1437	1438	N18	W66	.939		24.7	1	SN	2	C		16		
RAMY	29	1522	1523	1532	N 8	E66	.924		6.6	10	SB	2	C		25		
RAMY	29	1602	1604	1617	S14	E83	.989		7.9	15	SB	3	C		0		
RAMY	29	1617	1621	1626	S26	W75	.958		24.1	9	SN	3	C		21		
BIGB	29	1734	1738	1746	S10	W85	.994		23.4	12		1	C	1738	60		A
RAMY	29	1734	1736	1751	N14	W84	.998		23.4	17	SN	3	C		39		
RAMY	29	1740	1740	1744	N 8	E64	.911		6.5	4	SN	3	C		14		
BIGB	29	1801	1803	1805	N14	E90	1.000		8.5	4		1	C	1803	60		
RAMY	29	1810	1811	1829	S26	W30	.562		27.5	19	SN	3	C		55		
RAMY	29	2035	2049	2107	N22	E66	.945		6.8	32	SN	3	C		49		
BIGB	29	2054	2055	2059	N05	E69	.939		7.0	5		1	C	2055	10		
RAMY	29	2129	2134	2145	N22	E65	.940		6.8	16	SF	3	C		0		
RAMY	29	2137	2139	2144	N 8	W71	.953		24.6	7	SN	3	C		0		
PALE	30	0019	0022	0036	S27	W29	.558		27.8	17	SB	3	C		108		DE F
ATHN	30	1012E	1015	1040	S26	W32	.585		28.0	28D	SN	1		1015	196	1.6	
RAMY	30	1425	1429	1434	N 8	E53	.819		6.6	9	SB	3	C		26		
MCMA	30	1503E		1511	N15	W90	1.001	15777	23.9	8D	1N		C	1503			
MCMA	30	1504	1506	1510	S13	E77	.969	15800	8.4	6	SN		C	1506	25	1.2	D
HOLL	30	1530	1530	1551	S27	W35	.624		28.0	21	SN	3	C		53		
MCMA	30	1530E	1530	1553	S25	W40	.671	15786	27.6	23D	SN		C	1530	80	1.2	E
RAMY	30	1914	1914	1918	N 8	E50	.789		6.6	4	SN	3	C		27		
HOLL	30	2054	2056	2105	N10	E52	.815		6.8	11	SB	3	C		59		
RAMY	30	2055	2056	2102	N 8	E49	.779		6.5	7	SB	3	C		36		
HOLL	30	2059	2101	2105	N22	E51	.847		6.7	6	SN	3	C		19		
RAMY	30	2100	2100	2105	N22	E52	.855		6.8	5	SN	3	C		14		
RAMY	30	2106	2107	2113	S14	E68	.920		8.0	7	SN	3	C		24		
RAMY	30	2126	2139	2140	N22	E52	.855		6.8	14	SN	3	C		19		
HOLL	30	2149	2149	2204	N22	E51	.847		6.7	15	SN	3	C		15		
PALE	31	0301	0319	0323D	S28	W43	.714		27.9	22D	SN	3	C		55		FDE
ISTA	31	0735		0805	S07	E67	.916		8.3	30	SF						D
ISTA	31	0800		0812	N10	W90	1.000		24.6	12	SF						A
ISTA	31	0840		0850	N21	W73	.974		25.9	10	SF						D
ISTA	31	0912		0927	N07	E48	.765		7.0	15	SF						D
RAMY	31	1444	1507	1606	S25	W51	.785	15786	27.8	82	1B	3	C		322		FDE
RAMY	31	1614	1618	1642	S25	W51	.785		27.9	28	SB	3	C		104		F

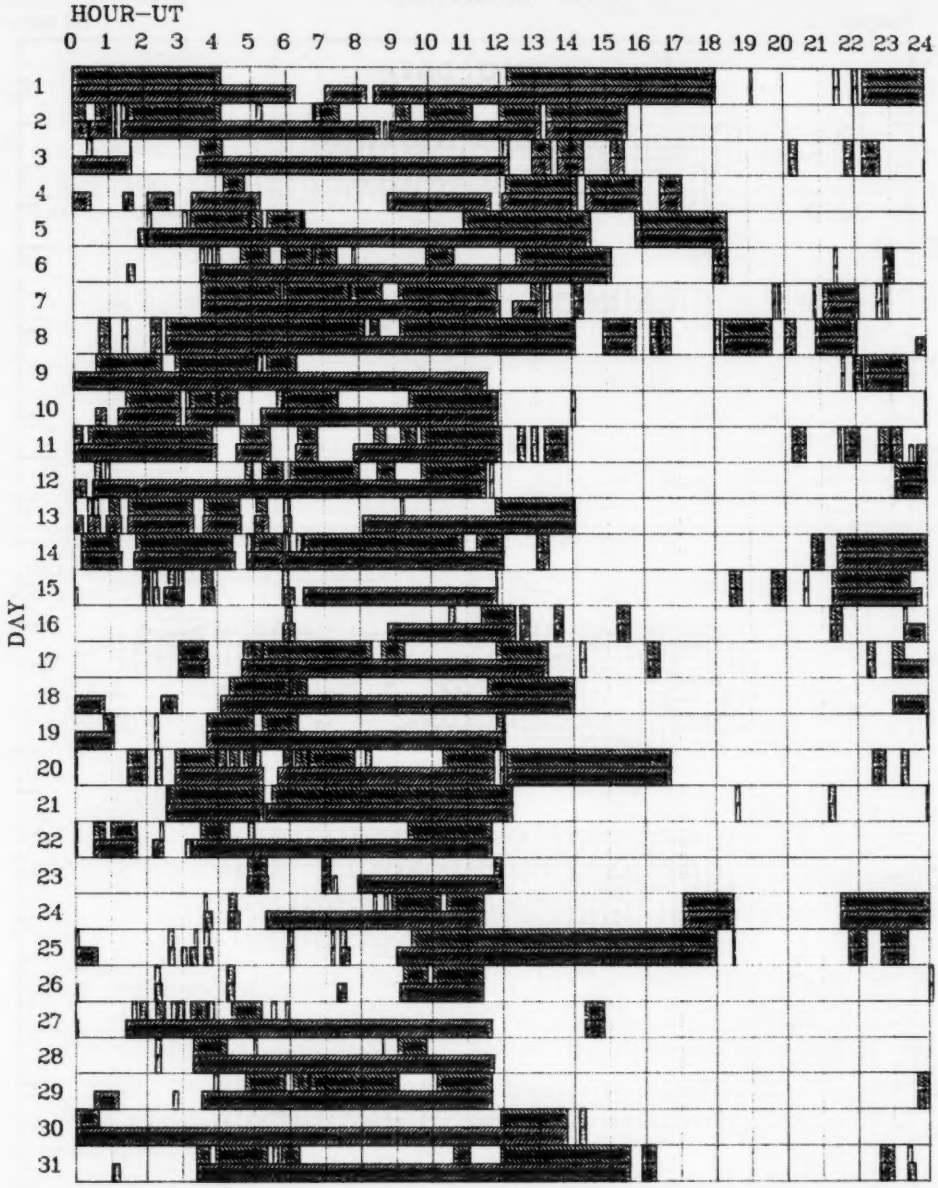
"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

JANUARY 1979



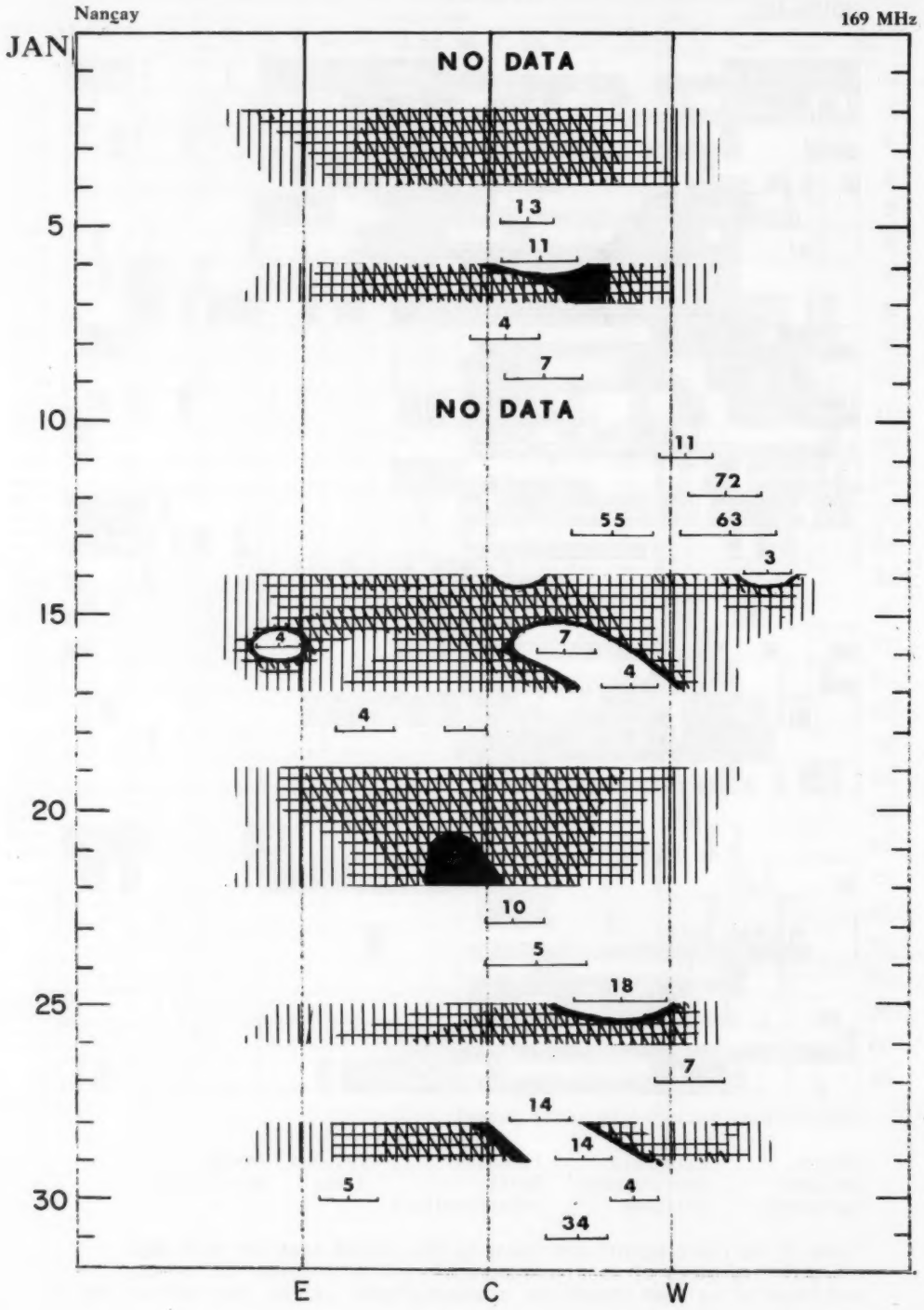
Observations included in total patrol:

Athens	Haleakala	Istanboul	Palehua	Tehran
Big Bear	Herstmonceux	Manila	Ramey	Wendelstein
Bucharest	Holloman	McMath-Hulbert		

Times of no flare patrol are shown by the shaded area for each day, divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day.)

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

JANUARY 1979

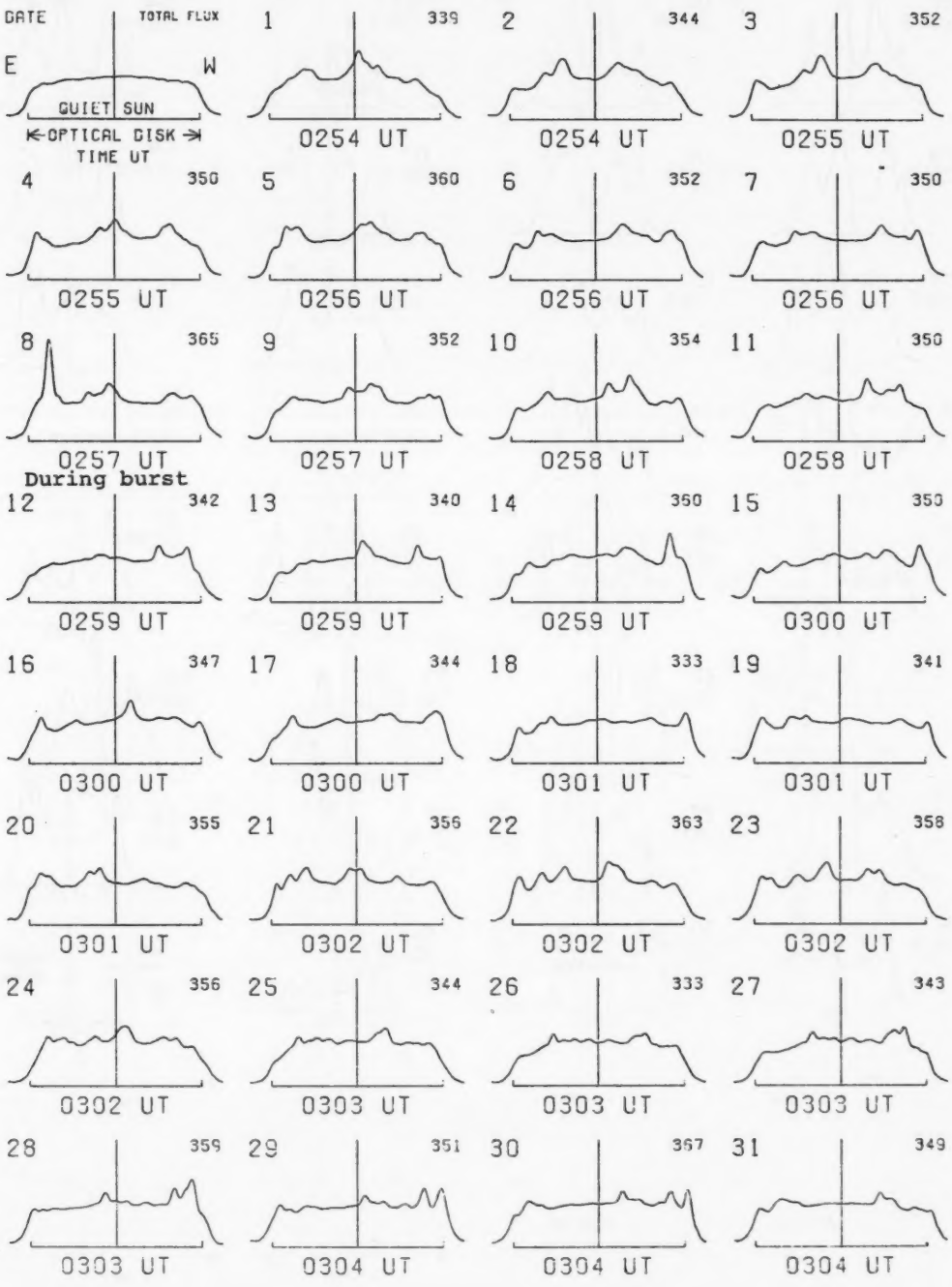


EAST-WEST SOLAR SCANS

JANUARY 1979

TOYOKAWA.JAPAN

3 CM
FAN BEAM WITH 1.1 MINUTES OF ARC



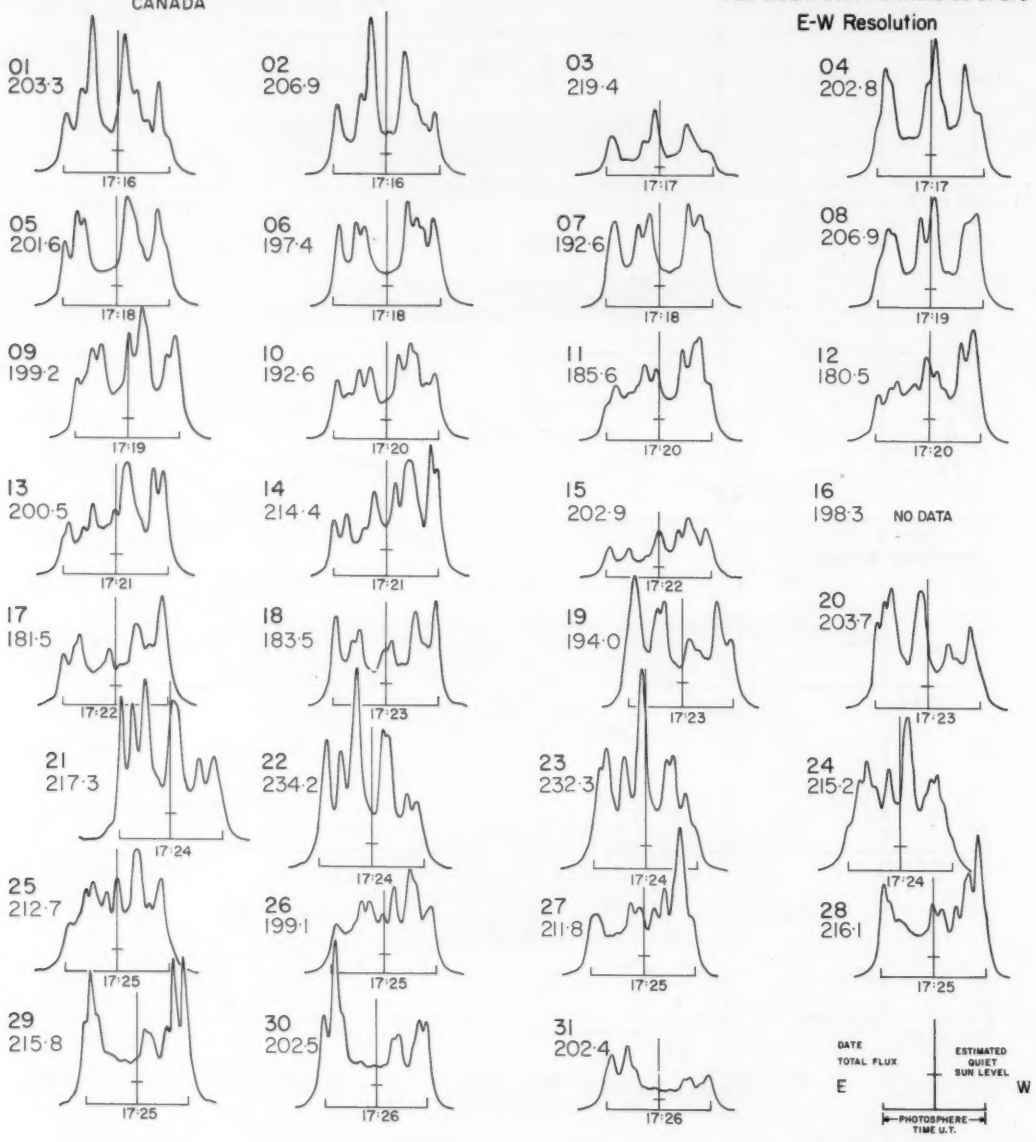
26
Jan 79

EAST-WEST SOLAR SCANS

JANUARY 1979

ALGONQUIN RADIO OBSERVATORY
CANADA

10·7cm
Fan Beam with 1·5 minutes of arc
E-W Resolution

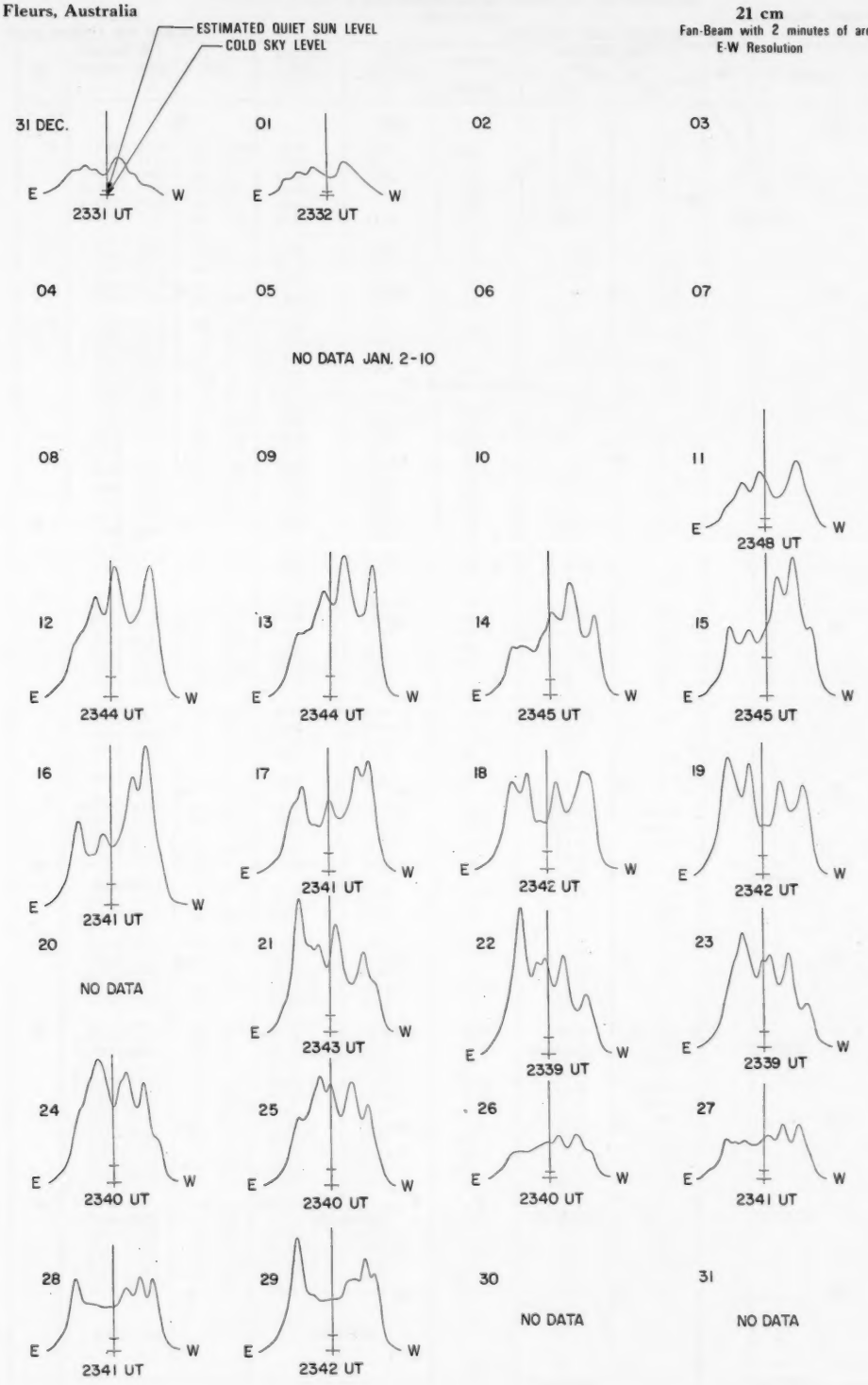


EAST-WEST SOLAR SCANS

JANUARY 1979

Fleurs, Australia

21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution



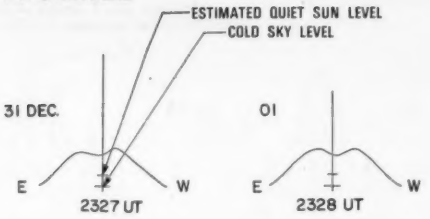
EAST-WEST SOLAR SCANS

JANUARY 1979

Fleurs, Australia

43 cm

Fan-Beam with 4 minutes of arc E-W Resolution



02

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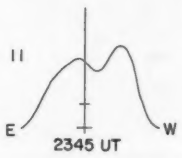
07

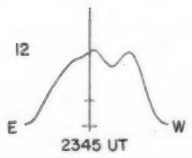
NO DATA JAN. 2-10

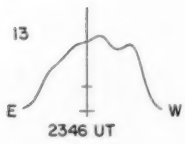
08

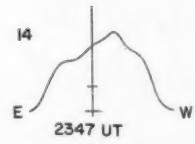
09

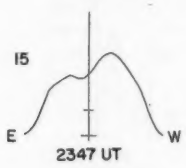
10

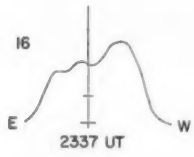


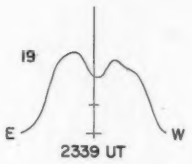


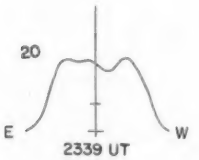


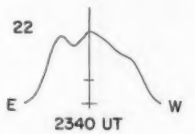


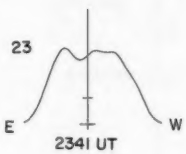


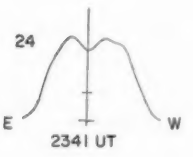


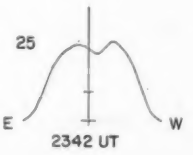


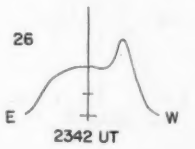


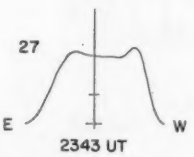


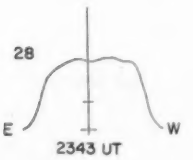


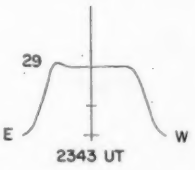












30

NO DATA

31

NO DATA

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JANUARY 1979

JAN 1979	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
1	2800	OTTA	20 GRF	1625	1720	115	3.8	1.9		
	2800	OTTA	20 GRF	1912	1917	15	2	1		
	2695	PENT	24 R	1935	1950	15	4	2		
	2695	PENT	27F RF	1935		135	4	3.4		
	2695	PENT	24P R	1950		95	4			
	2695	PENT	26 FAL	2125	2150	25	-4	-2		
2	2800	OTTA	240 R	1500	1520	20	2.6			
	2800	OTTA	1 S	1552	1553	1.5	1.2	.6		
	2800	OTTA	20 GRF	1715	1750	50	2.2	1.4		
	2800	OTTA	45 C	1824	1825	7	3.8	1.9		
	2800	OTTA	20 GRF	1920	1955	70	8	4.4		
3	2800	OTTA	20 GRF	1432	1438	12	1.4	.7		
	2800	OTTA	8 S	1451.2	1453.5	.7	1.8			
	2800	OTTA	8 S	1512.3	1512.5	.7	3.2	2.7		
	2800	OTTA	24 R	1520	1550	30	6.6	3.8		
	2800	OTTA	27A RF	1520		230	6.6	5.8		
	2800	OTTA	8 S	1548.6	1548.6	.1E	15.6			
	2800	OTTA	24P R	1550		175	6.6			
	2800	OTTA	20 GRF	1555	1602.3	40	10	6		
	2800	OTTA	21 GRF	1645	1721	110	11			
	2800	OTTA	22 GRF	1807	1815	25	5.4	3		
	2800	OTTA	26 FAL	1845	1910	25	-6.6	-3.3		
	2800	OTTA	26 FAL	1930	2000	30	-3	-1.5		
	2695	PENT	240 R	2010	2030	20	4	2		
	2695	PENT	21 GRF	2144	2149	13	4	2		
	2695	PENT	3 S	2145	2145.7	1	13.2	6.6		
	2695	BOUL	3 S	2146 E	2147	2 D	13	4		
4	2800	OTTA	20 GRF	1420 E	1553	230 D	7.8			
	2800	OTTA	240 R	1905	2005	60	8.4	4.2		
5	2800	OTTA	1 S	1424	1424.4	1	5.2	2.6		
	2800	OTTA	20 GRF	1520	1535	30	2.4	1.8		
	2800	OTTA	26 FAL	1640	1740	60	-3	-1.5		
	2800	OTTA	21 GRF	1820	1847	95	10.6	5		
	2800	OTTA	3 S	1829	1832	13	13.4	6.5		
	2695	BOUL	22 GRF	1830.5E	1833	27 D	17	6		
	2695	PENT	1 S	2028	2029	2	2.8	1.4		
6	2695	MANI	4 S/F	0009.1	0009.8	3.4	10.5	3.5		1
	2800	OTTA	2 S/F	1454	1454.3	1	2.4			
	2800	OTTA	8 S	1748.8	1749	.3	3.2			
	2695	PENT	1 S	2055	2056	10	2.8	1.4		
7	2800	OTTA	240 R	1900	1935	35	4	2		
8	2695	MANI	47 GB	0224	0237.9	37.5	575	190.8		1
	8800	MANI	47 GB	0226.4	0238.2	35.2	963.3	321.1		1
	2800	OTTA	3 S	1441.5	1441.9	1.5	11.4	5.7		
	2800	OTTA	23 GRF	1520	1540	50	2.4			
	2800	OTTA	1 S	1551.5	1552.5	2	1.4	.7		
9	2800	OTTA	1 S	1654	1654	1.5	5.8	2.7		
	2800	OTTA	1 S	1907.5	1908	7	4	1.8		
	2695	PENT	20 GRF	2000	2030	60	2.8	1.4		
10	2800	OTTA	21 GRF	1840	1940	70	3.8	2		
	2800	OTTA	8 S	1843	1843	.5	1.4	.7		
	2800	OTTA	1 S	1849.5	1850.2	2	3.6	1.8		
	2695	PENT	21 GRF	2050	2110	70 D	8.4			
	2695	PENT	1 S	2057.5	2058	1	3	1.5		
11	2695	MANI	4 S/F	0057	0100.1	5.3	22.3	7.4	I	1
	2695	MANI	3 S	0647.9	0648.9	2.1	15.6	5.2		2
	8800	MANI	3 S	0647.9	0648.9	2.1	106.8	35.6		2
	8400	BERN	42	0741	0743.1	15	250		13R	
	8800	MANI	4 S/F	0742.8	0743.4	6.9	270.6	180.4		3
	2695	MANI	4 S/F	0742.9	0743.8	7.2	127.4	84.9		3
	2800	OTTA	21 GRF	1445	1515	65	2.4	1.6		
	2800	OTTA	8 S	1508	1508	.2	10.2			
	2800	OTTA	26A FAL	1640	1705	25	-3.2	-1.6		
	2800	OTTA	1 S	1659	1659.7	3	5.6	3.8		
	2800	OTTA	20 GRF	1739	1741	35	2.8	1.4		
	2800	OTTA	26 FAL	1902	1910	8	-1.6	-.8		
12	2695	MANI	4 S/F	0025.3	0027.7	7.7	35.8	23.8		1
	8800	MANI	4 S/F	0025.9	0027	4.6	96.3	64.2		1
	2800	OTTA	2 S/F	1525	1527	5	5.6	1.8		
	2800	OTTA	1 S	1621.8	1621.9	1.5	1.2	.5		
	2800	OTTA	2 S/F	1635.9	1636.1	6	2.6	1.3		
	2800	OTTA	20 GRF	1740	1800	60	3.4	2.2		
	2695	PENT	1 S	2112	2114	8	1.4	.7		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JANUARY 1979

JAN 1979	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22}Wm^{-2}Hz^{-1}$ PEAK	FLUX DENSITY $10^{-22}Wm^{-2}Hz^{-1}$ MEAN	INT	REMARKS
13	2800	OTTA	26A FAL	1605	1615	130	-9.2	-5		
	2800	OTTA	1 S	1651.2	1651.8	1	2.4	1.2		
	2800	OTTA	3 S	1817	1818	7	27	7		
	2695	BOUL	3 S	1818.5E	1819	1.5D	25	8		
	2800	OTTA	240AR	1850	1920	30	8	4		
	2800	OTTA	1 S	1903	1903.5	2	2.4	1.2		
	2800	OTTA	1 S	1906.5	1907	1	2.8	1.4		
	2800	OTTA	8 S	1908.8	1908.8	.2	18			
	2800	OTTA	45 C	1931	1934.5	8	56	19.2		
	2695	BOUL	28 PRE	1932.5E	1933.5	2.5D	47	16		
	2695	BOUL	3 S	1935 E	1935.5	1.5D	54	18		
	2695	BOUL	29 PBI	1936.5E	1936.5	3.5D	6	2		
	2800	OTTA	30 PBI	1939	1939	120	9.6	4.8		
	2800	OTTA	1 S	2046	2046.5	1	6.8	3.4		
	2695	BOUL	3 S	2306.5E	2308	2.5D	41	14		
14	8400	BERN	8	1154.2	1154.9	4.5	418			3R
	8400	BERN	45	1255.4	1256.5	10	45			15R
	2800	OTTA	23 GRF	1435	1650	255	8.4	4.2		
	2800	OTTA	1 S	1537.5	1539	2.5	2.8	1.4		
	2800	OTTA	1 S	1608.5	1609	2	3.4	1.2		
	2800	OTTA	26 FAL	1850	2010	80	-12.8	-6.4		
	2695	MANI	4 S/F	2304.5	2307.7	5.3	35.3	11.7		1
	2695	PENT	4 S/F	2305	2307.5	5	35	12		
	8800	MANI	4 S/F	2306	2307.6	3.1	292.3	94.1		1
15	2800	OTTA	4 S/F	1334.8	1336	4	102	26		
	2800	OTTA	21 GRF	1615	1700	100	4.2	2.1		
	2800	OTTA	1 S	1651.4	1651.6	1	4.8	2		
	2800	OTTA	20 GRF	1810	1845	100	3.4	1.7		
	2695	PENT	4 S/F	2006	2007.7	4	31	15.5		
	2695	BOUL	3 S	2008 E	2008.5	2 D	40	13		
	2695	BOUL	29 PBI	2009.5E	2009.5	20.5D	19	6		
	2800	OTTA	30 PBI	2010	2010	100	8.8	4.4		
	2800	OTTA	4 S/F	2024	2025.6	5	19.8	4.8		
	2695	BOUL	3 S	2026 E	2026	.5D	33	11		
	2695	BOUL	42 SER	2128 E	2129	3 D	27	9		
	2695	PENT	1 S	2233	2233.5	1	5.6	2.8		
16	2695	MANI	4 S/F	0736.2	0742.2		68			1
	2695	MANI	47 GB	0736.2	0736.4	10.6	544	23		1
	8800	MANI	4 S/F	0738.9	0742.4	6.3	152.7	50.9		1
	8400	BERN	45	0741	0743.4	11	66			OPR
	2800	OTTA	27 RF	1430		180	3	2.6		
	2800	OTTA	24 R	1430	1440	10	3	1.5		
	2800	OTTA	24P R	1440		135	3			
	2800	OTTA	26 FAL	1655	1730	35	-3	-1.5		
	2800	OTTA	1 S	1749.5	1750	2	4.6	2.3		
	2800	OTTA	29 PBI	1751.5	1751.5	20	2.4	1.8		
	2800	OTTA	240 R	1840	1846	6	4	2.6		
	2800	OTTA	23 GRF	1853	1854.5	105	5.4			
	2800	OTTA	1 S	1854.8	1855.1	1	8.2	4		
	2800	OTTA	2 S/F	1937.7	1939.4	3	4			
	2695	PENT	240 R	2140	2205	25	5	2.5		
	2695	PENT	4 S/F	2243.2	2244.5	4	19	9.2		
	2695	BOUL	3 S	2244 E	2245	2.5D	27	9		
17	2800	OTTA	1 S	1437	1437.5	1.5	1.4	.7		
	2800	OTTA	20 GRF	1605	1607	20	8	2.6		
	2695	PENT	20 GRF	2047	2051.5	23	3.2	1.4		
	2695	PENT	6 S	2212.7	2213	.7	3.2	1.6		
18	2800	OTTA	1 S	1833	1834.2	3	1.4			
19	2800	OTTA	240 R	1430	1440	10	2	.8		
	2800	OTTA	240 R	1530	1545	15	4	2		
	2800	OTTA	1 S	1550	1550.4	1	8	1.6		
	2800	OTTA	240 R	1705	1740	35	5.6			
	2800	OTTA	21 GRF	1750	1843	55	4	1.8		
	2800	OTTA	8 S	1831.6	1831.6	.1	2			
	2695	PENT	20 GRF	1940	2007	75	3.6	1.8		
	2695	PENT	240 R	2115	2135	20	3.6	1.8		
20	2800	OTTA	20 GRF	1710	1720	15	2.4	1.2		
	2695	PENT	20 GRF	2103	2104	25	2.8	1.4		
	2695	PENT	20 GRF	2130	2150	20	3.6	1.8		
21	2800	OTTA	4 S/F	1312	1313.5	6	138	35		
	2800	OTTA	21 GRF	1420 E	1445	155 D	6.6			
	2800	OTTA	1 S	1511.5	1511.8	1.5	1.4	.7		
	2800	OTTA	20 GRF	1740	1753	30	3.4	1.7		
	2800	OTTA	240 R	1820	1830	10	4.2	2.1		
	2800	OTTA	22 GRF	1855	2110	210	10.6	5.3		
22	8400	BERN	20	0956.9	1013.5	84	10			OPR

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS
JANUARY 1979

JAN 1979	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	REMARKS
	2800	OTTA	8 S	1750	1750.5	.6	5.8			
	2800	OTTA	1 S	1755.7	1756.5	5	4.6	1.6		
	2800	OTTA	21 GRF	1821	1825	55	6.6	3		
	2800	OTTA	1 S	1823	1823.5	1.5	5.8	2.6		
	2695	BOUL	3 S	1824 E	1825	2.50	14	5		
23	2800	OTTA	240 R	1500	1535	35	8.4			
	2695	PENT	2 S/F	1715	1718	9	6.2			
	2800	OTTA	1 S	1755	1755.5	2.5	3.8	1.9		
	2800	OTTA	8 S	1820.3	1820.6	.5	1.4	.7		
	2800	OTTA	1 S	1832	1832.1	1	2.2	1.1		
	2695	PENT	4 S/F	2006	2008.5	5	11.4	3.8		
	2800	OTTA	3 S	2031.9	2032.2	2.1	103	34.2		
	2695	BOUL	3 S	2032.5E	2033.5	2.50	118	40		
	2800	OTTA	29 PBI	2034	2034	10	4	1.8		
24	2695	MANI	4 S/F	0417.3	0420.1	5	21.3	7.1		IG 1
	8400	BERN	4	0911.2	0913.8	23	45			12L
	2800	OTTA	21 GRF	1859.5	1904	20	2	1		
	2800	OTTA	1 S	1900	1901	2	3.2	1.4		
	2800	OTTA	1 S	1910.5	1912.5	6	9.4	3.2		
	2695	PENT	20 GRF	2000	2001.5	20	2.4	1.2		
	2695	PENT	1 S	2054	2055.5	4	1.6	.7		
	2695	PENT	20 GRF	2135	2200	60	4	2.2		
	2695	PENT	1 S	2256	2256.5	1.7	6.4	3.2		
25	2695	MANI	3 S	0725.5	0725.7	2	19.2	6.4		2
	8400	BERN	20	1056.1	1100.3	13	35			OPR
	8400	BERN	4	1416.2	1417.9	9	83			OPR
	2800	OTTA	21 GRF	1440 E		30 D	6.4			
	2800	OTTA	4 S/F	1441	1445	5	10.2	2.6		
	2695	PENT	20 GRF	2010	2053	130	7	3.6		
26	8400	BERN	8	1411.9	1412.1	.4	14			OPR
	2800	OTTA	20 GRF	1600	1625	50	3.4	1.7		
	2800	OTTA	1 S	1752	1754	10	3.8	1.9		
	2800	OTTA	240AR	2020	2050	30	3.8	1.9		
	2800	OTTA	20 GRF	2029	2032	11	4	2		
27	2800	OTTA	2 S/F	1557.5	1558	2	9.6	2.4		
	2695	BOUL	3 S	1558.5E	1559.5	2 D	11	4		
	2800	OTTA	1 S	1715.5	1716.2	1	3.2	1.6		
	2695	PENT	240 R	1745	1825	40	3.8	1.9		
	2800	OTTA	21 GRF	1837	1846	23	3.8	1.9		
	2800	OTTA	4 S/F	1848	1849.3	2.5	16	7.8		
	2695	BOUL	3 S	1849 E	1850.5	3 D	13	4		
	2695	PENT	21 GRF	1910	2050	230 D	16			
	2695	PENT	1 S	2229.5	2229.8	1.5	4	2		
	2695	PENT	20 GRF	2237	2239	13	5.2	3		
	2695	PENT	8 S	2325.5	2325.8	.5	24	12		
28	2695	MANI	3 S	0306.1	0307.1	2.6	26	8.6		1
	2695	MANI	3 S	0522.7	0523	1	133.2	44.4		2
	8800	MANI	8 S	0522.7	0522.9	.6	322.7	107.6	I	2
	2800	OTTA	1 S	1421.7	1422.1	1.5	9.6	3.2		
	2800	OTTA	1 S	1517.5	1518.2	1.5	2.6	1.3		
	2695	BOUL	1 S	1805.5E	1806.5	2 D	9	3		
29	2695	MANI	4 S/F	0204.9	0205.1	2.5	20.2	6.7		1
	2800	OTTA	4 S/F	1601.5	1602.5	5	18	6		
	2695	BOUL	3 S	1603 E	1603.5	2.50	24	8		
	2800	OTTA	1 S	1649	1650.5	6	9.4	3		
	2800	OTTA	8 S	1735.4	1735.7	.5	1.6	.8		
	2800	OTTA	20 GRF	1950	1956	30	2.6	1.3		
	2695	PENT	1 S	2139	2139.7	1	5.2	2.6		
	2695	PENT	29 PBI	2140	2140	8	2	1		
30	2695	PENT	8 S	1425	1425.3	.5	3.2	1.6		
	2800	OTTA	20 GRF	1527	1530	30	3.8	2		
	2800	OTTA	21 GRF	1600		160	4.6	2.6		
	2800	OTTA	8 S	1650	1650.3	.8	4.4			
	2800	OTTA	2 S/F	2054.2	2054.5	1	4.6			
31	2800	OTTA	21 GRF	1442	1521	140	10	5.6		
	2800	OTTA	3 S	1443	1445.5	9	16.8	5.6		
	2800	OTTA	2 S/F	1502	1504	6	4.4	2.2		
	2800	OTTA	22 GRF	1601.5	1611	11	2.2	1.1		
	2800	OTTA	1 S	1613.5	1617	6.5	4.4	2.6		
	2800	OTTA	21 GRF	1800	1825	95	3	1.5		
	2800	OTTA	1 S	1917	1917.3	1	2.8	1.4		
	2800	OTTA	1 S	1942	1945	6	1.8	.9		
	2800	OTTA	22 GRF	2045	2137	135	5.4	3.9		

Observatories:

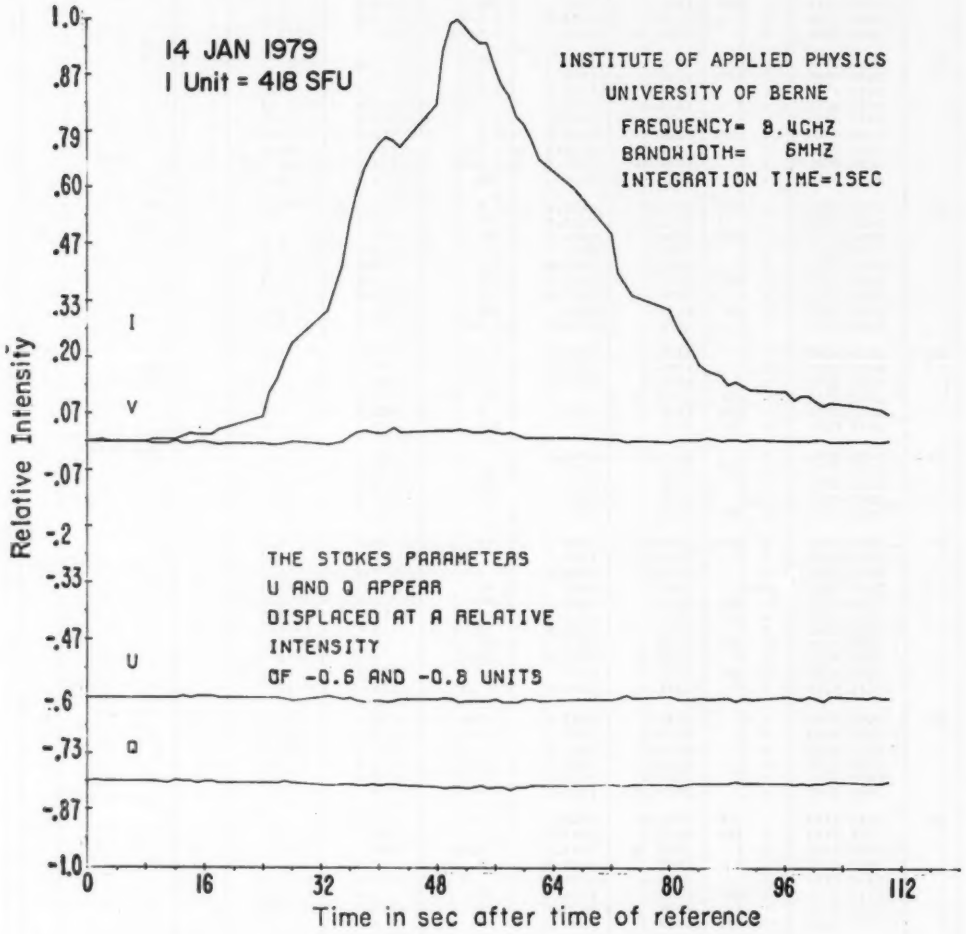
BERN = Berne BOUL = Boulder MANI = Manila OTTA = Ottawa ARO PENT = Penticton SGMR = Sagamore Hill

Explanation of Type Code:

1 Simple 1	6 Minor	22 Simple 3F	27 Rise and Fall	32 Absorption	44 Noise Storm in Progress
2 Simple 1F	7 Minor +	23 Simple 3AF	28 Precursor	40 Fluctuation	45 Complex
3 Simple 2	8 Spike	24 Rise	29 Post Burst Increase	41 Group of Bursts	46 Complex F
4 Simple 2F	20 Simple 3	25 Rise A	30 Post Burst Increase A	42 Series of Bursts	47 Great Burst
5 Simple	21 Simple 3A	26 Fall	31 Post Burst Decrease	43 Onset of Noise Storm	48 Major
					49 Major +

SELECTED SOLAR NOISE BURSTS

DECEMBER 1978



SOLAR X-RAYS BY SATELLITE
SMS-1 GOES

SMS/GOES Preliminary Solar X-ray data are no longer being provided by the NOAA Space Environment Laboratory. These one-minute averaged data (without noise editing) were made available to us as a stop-gap measure until final archive data became available on a routine basis. The preliminary data are judged a little too low in scientific quality for SGD publication. The final high quality archive data are now held by NGSDC in the form of microfilms of hourly graphs and digital magnetic tape.

We have been approached in the past by scientists requesting publication of daily plots of these data, rather than hourly values. A request to produce these plots has been in our computer programming queue for some time, and has now been assigned a top priority. We expect to publish these in the SGD Comprehensive Reports in the future.

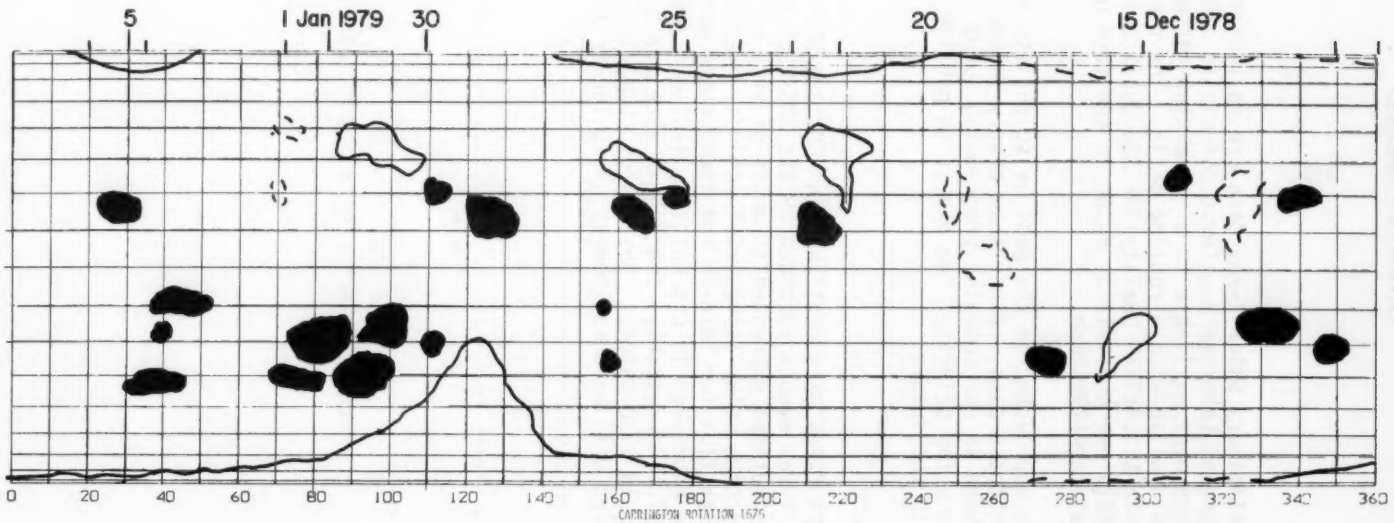
ERRATA to SMS/GOES X-ray Data published in SGDs 364-412 Part I:

Preliminary x-ray events recorded by the SMS/GOES satellites and tabulated each month were sometimes expressed in units of ergs $cm^{-2}s^{-1}$ rather than in Wm^{-2}. In constructing solar-terrestrial activity graphs for Cycle 21, we plotted the daily 1-8Å peak flux for 1976-78 and found three periods during which these x-ray events were expressed in cgs units: 14-31 Dec. 1976, 4 Jan.-20 Apr. 1977 and 1-13 Dec. 1977. Regrettably, the 0.5-4Å data may contain a similar kind of error. Users should also suspect those event summaries published for 1974 and 1975. Flux entries will be three powers of 10 larger in the cgs system than in the mks.

HELIUM 10830Å SYNOPTIC MAPS

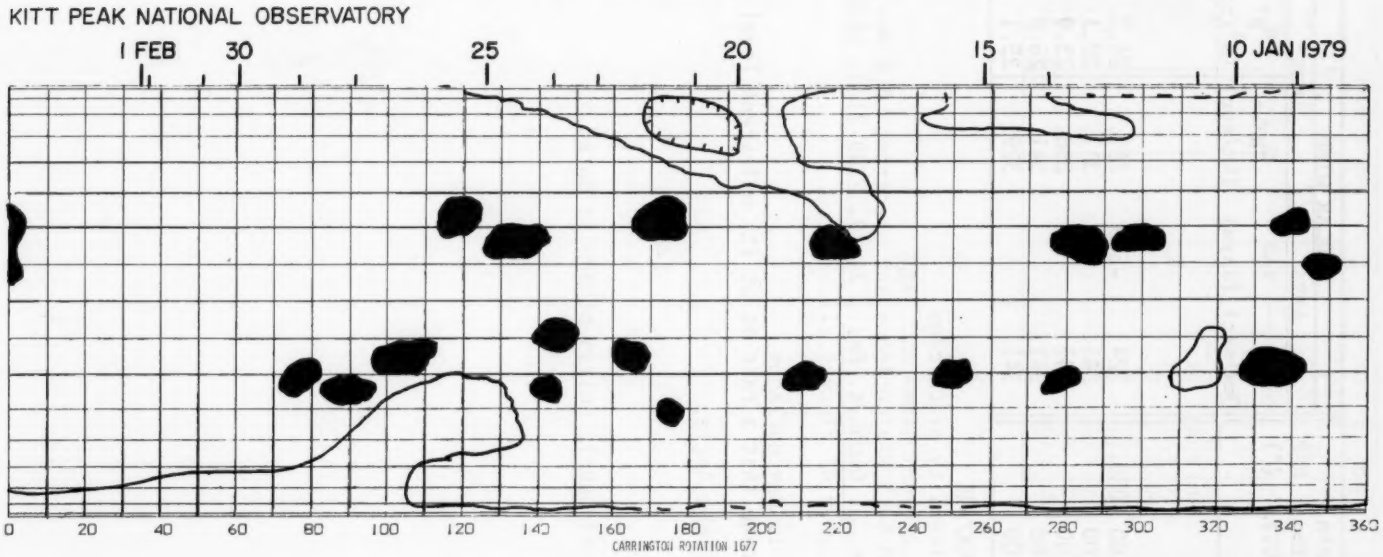
CARRINGTON ROTATION 1676

KITT PEAK NATIONAL OBSERVATORY



HELIUM 10830Å SYNOPTIC MAPS

CARRINGTON ROTATION 1677



PIONEER VI

JANUARY 1979

Date	DSN Coverage (UT)	Data Time (UT)	ESP (°)	SOLAR WIND				COSMIC RAY PROTONS[3] (particles/sec)		
				AMES[1]		MIT[2]				
				U_{H^+} (km/sec)	TAU (days)	U_{H^+} (km/sec)	N_{H^+} (H^+/cc)	6-13 (Mev*)	13-175 (Mev**)	>175 (Mev)
17	0121-0452	0100	-088.	324.	-5.9	295.	24.3	1.59	0.1	1.41
		0200		341.		317.	22.1	1.52.	.1	1.61
		0300		341.		298.	23.9	1.37	.093	1.64
		0400		341.		341.	26.8	1.46	.105	1.55
		0500		341.		329.	25.1	1.44	.115	1.55

[1] Wolfe - NASA/ARC
[2] Simpson - University of Chicago

* Includes He 0.6-13 Mev/nucleons and electrons ∿0.5 Mev - see J. Retzler and J. A. Simpson, J. Geophys. Res., 74, 9, 2149-2160, 1969 for discussion of the electron response of Pioneer VII.

** Includes He >13 Mev/nucleons.
Q Used to indicate that a rate is at its quiescent level.

ESP = Earth-Sun Probe Angle.

† Peak velocity.

Note: Data sampled hourly unless otherwise noted.

PIONEER IX

JANUARY 1979

Date	DSN Coverage (UT)	Data Time (UT)	ESP (°)	SOLAR WIND[1]				IP E-FIELD[2]	IMF[3]		COSMIC RAY PROTONS[4] (particles/sec)	
				U_{H^+} (km/sec)	N_{H^+} (H^+/cc)	T_{H^+} ($\times 10^6$°K)	TAU (days)	400 Hz (mv)	|B| (γ)	φ (°)	>13.9 Mev	>40 Mev
15	2335-0639	2300	-111.	314.			-8.1	0.33	9.	239.	5.62	0.84
		2400		303.				.24	10.6	079.	5.62	.7
16		0100		314.				.25	10.4	279.	5.56	.73
		0200		314.				.21	11.2	348.	5.56	.85
		0300		314.				.26	8.7	279.	5.35	.74
		0400		314.				.18	10.3	289.	5.18	.75
		0500		314.				.22	10.3	278.	5.66	.78
		0600		314.				.28	10.	291.	5.71	---
		0700		314.				---	10.1	288.	5.51	---

[1] Wolfe - NASA/ARC
[2] Scarf - TRW, Inc.
[3] Sonett and Colburn - NASA/ARC
[4] Webber - Univ. of N.H.

ESP = Earth-Sun Probe Angle.

Note: Data sampled hourly unless otherwise noted.

PIONEER XII

JANUARY 1979

DATE JAN '79	TIME (UT)	ESV (°)	U_{H^+} (Km/sec)	N_{H^+} (H^+/CC)	T_{H^+} (x10^6°K)
1	1201	032.	563.	10.9	0.367
2	0908		629.	4.2	.283
3	1224		474.	3.7	.062
4	0901		598.	7.5	.549
5	0541		602.	4.8	.224
6	1714		483.	7.2	.154
7	0913		475.	9.1	.1
8	1212		498	24.6	.013
9	1214		372.	11.6	.021
10	1102		375.	11.5	.066
11	1248		370.	30.5	.042
12	1503		368	36.	.048
13	1204		291.	37.3	.026
14	1143		297	77.	.015
15	1201		324.	42.7	.053
16	1815	042.	443.	21.2	.176
17	1554		347.	18.3	.069
18	1416		422.	12.7	.154
19	1206		324.	21.2	.02
20	1431		319.	88.4	.013
21	0910		337.	51.5	.02
22	1431		398.	21.5	.101
23	1520		432.	15.5	.221
24	1416		464.	13.5	.137
25	1040		363.	17.5	.091
26	1436		337.	10.3	.04
27	1433		317.	28.5	.018
28	1122		336.	31.4	.04
29	1253		378	28.	.116
30	0607		485.	11.5	.413
31	1024	051.	480.	5.2	.12

SOLAR WIND

Interplanetary Scintillations

JANUARY 1979

DAY	3C48 VEL	ERR	3C144 VEL	ERR	3C147 VEL	ERR	3C161 VEL	ERR	3C237 VEL	ERR	3C273 VEL	ERR	3C298 VEL	ERR	3C459 VEL	ERR
1	383	48									592	35	511	4		
2											503	4	407	19		
3											632	51	517	10		
4	486	26											433	19	362	7
5	547	10									455	4	331	19	592	12
6	486	15							444	8	462	3	450	9	510	17
7	377	4							653	101	617	21	490	46	369	7
8	531	3									381	7	374	20	479	5
9	413	57							524	11	490	5	444	4		
10	318	6							352	33	451	9	438	22	359	29
11	403	14									431	6	377	5	434	35
12	381	11									462	6	313	4	331	61
13	375	19									378	22	273	12	351	11
13															328	8
14	304	5									376	10	270	4	403	12
15	361	4									346	3	265	8	423	30
16	360	4									362	30	286	5	518	41
17	450	7									424	9	257	4	414	28
18	455	4									291	21	334	4	367	9
19	443	4									268	40	322	40	272	43
20	343	4									414	27			266	16
21											355	65	397	9	283	7
22	390	4											423	13	348	34
23	379	25									509	28	411	21	389	11
24	353	4									390	22	448	5	499	20
25	517	14	612	6	553	53					475	47	363	15	291	81
26	332	66					409	29					422	131	275	9
27	412	30													294	17
28											537	132	431	29	298	11
29											598	170	450	33	418	48
30	297	75									604	69	416	25		
31	383	7					338	77					329	11	287	36

JANUARY	5				15				25			
	UT	LAT	DIST	DLON	UT	LAT	DIST	DLON	UT	LAT	DIST	DLON
3C48	3.	3.	1.13	-13.	2.	2.	1.09	-14.	1.	1.	1.04	-15.
3C144	7.	-3.	1.28	-5.	6.	-4.	1.27	-7.	5.	-5.	1.24	-9.
3C147	6.	2.	1.26	-3.	5.	2.	1.25	-5.	4.	1.	1.23	-7.
3C161	8.	-9.	1.27	-2.	7.	-10.	1.26	-4.	7.	-11.	1.25	-6.
3C237	12.	-5.	1.23	10.	11.	-6.	1.26	8.	10.	-6.	1.28	6.
3C273	14.	-3.	1.09	16.	13.	-4.	1.14	14.	12.	-5.	1.18	13.
3C298	15.	0.	0.97	17.	15.	0.	1.02	17.	14.	-1.	1.07	16.
3C459	0.	2.	0.92	-23.	23.	4.	0.83	-32.	23.	6.	0.72	-42.

Note: 3C459 observed at 0 hr. UT until Jan. 13th and at 23 hr. UT from Jan. 13th onwards.

INFERRED IP MAGNETIC FIELD

BARTELS ROTATION	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1972	OCT 22					-	AT														AT	AT				*		
1973	NOV 18			TA	AT						-		AT							*				*				
1974	DEC 15				-	-	-		AT	-		AT			AT		AT			TA		TA		TA		*		
1975	1978 JAN 11		*		*					*		*						*			TA		-	AT		-		-
1976	FEB 7						*	TA				-			-						-			*		TA	A*	TA
1977	MAR 6	TA			-				AT			T*	*					TA			AT	AT		AT		AT	*	TA			
1978	APR 2							*		-		AT										AT	AT							
1979	APR 29		TA		*		TA	AT	AT	TA			-		-	T*					TA	TA		AT						
1980	MAY 26				TA			AT	AT				-				AT		TA			-					-		-	
1981	JUN 22	TA						A*					-	TA		TA	TA				*				*	AT		AT	-		AT		
1982	JUL 19									TA								-			TA					AT		AT	*		TA		
1983	AUG 15					TA			AT		AT	AT			AT		TA					A*							TA		
1984	SEP 11			TA		AT				TA		T*						A*		-					-			A*	TA	-		
1985	OCT 8		*	TA			T*		AT			-	-	-					TA		TA	-		AT			-				
1986	NOV 4				-			-	AT	-		-							*	AT		-		AT		AT		AT			
1987	DEC 1	AT		AT						-		-	TA		-	AT	-		-	TA	-		A*		-		*			-		
1988	DEC 28			-		-		-																								

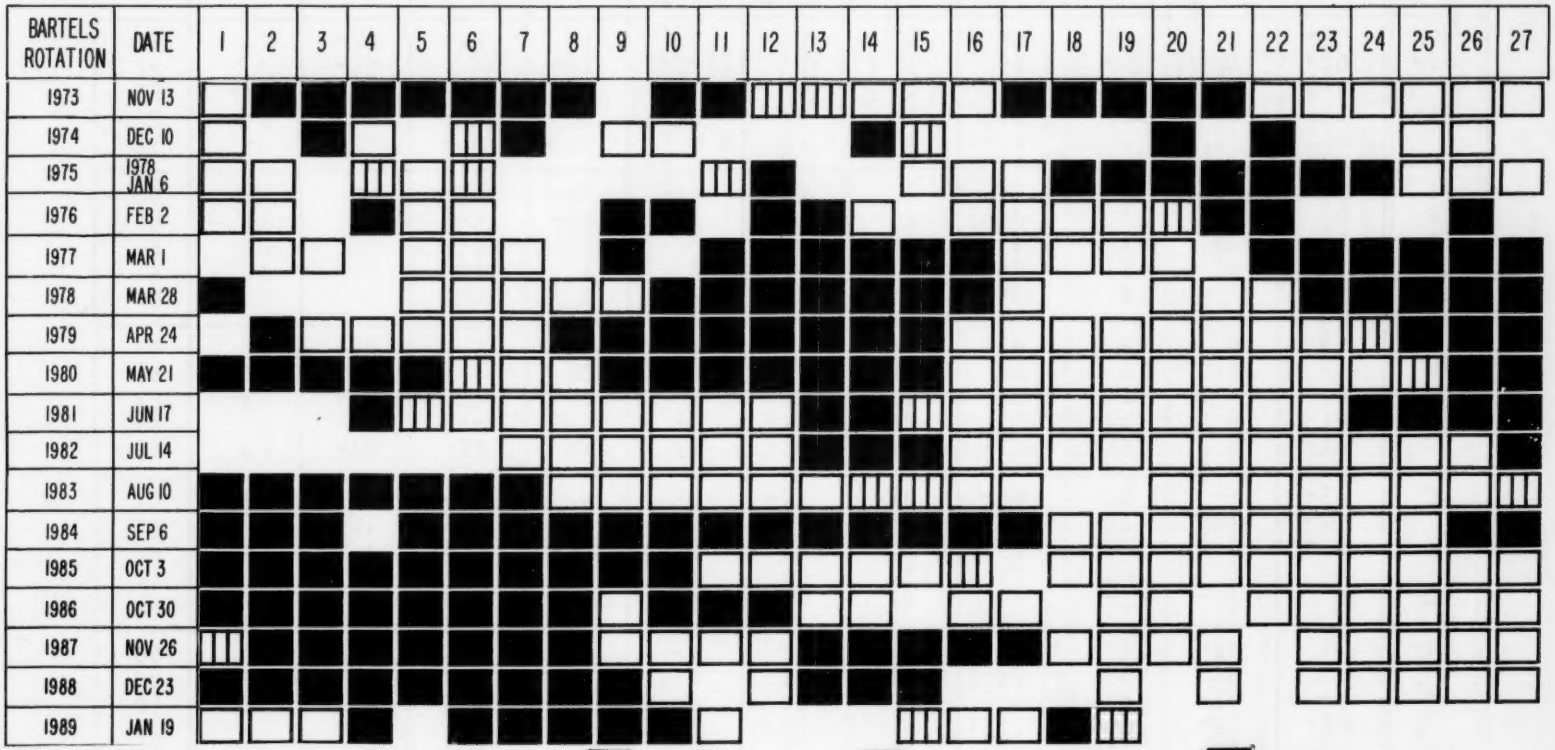
▩ = definitely towards the sun ▢ = definitely away from the sun

T = towards the sun A = away from the sun * = effect doubtful or not discernible - = missing data

The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.

NOTE: Thule data reduction analysis delayed. Both Thule and Vostok data for January 1979 will be included next month.

STANFORD MEAN SOLAR MAGNETIC FIELD



POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: □ = FIELD >2μT, ▥ = -2μT ≤FIELD ≤2μT, ■ = FIELD <-2μT

No box visible indicates no data available for that day.

Note: Data are taken daily at 2000 UT. Dates given are not Bartels Rotation dates. These earlier dates correspond to the occurrence of phenomena on the sun which affect the Earth during the given Bartels Rotation.

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

	1978										1979
	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.
DAY												
01	16	.	52	-12	-28	1	40	26	-11	-18	-72	11
02	31	22	46	-34	-22	13	39	32	-20	-21	-39	.
03	26	12	43	-27	-12	15	42	15	-14	-36	-7	15
04	.	.	13	-27	-5	18	39	18	-8	-28	17	-6
05	-5	8	4	-29	6	24	31	2	-3	-19	19	-25
06	4	11	-15	-27	5	43	29	-24	-7	-12	9	-26
07	9	4	-32	-23	21	42	30	-12	-20	3	5	.
08	.	.	-53	-12	33	36	17	-7	-29	-6	-15	.
09	.	-31	-52	3	41	16	-11	.	-37	-17	-26	.
10	-28	.	-41	24	40	-11	-10	-35	-29	-3	-37	27
11	-43	-70	-32	41	23	-17	-15	-34	-32	5	-19	.
12	.	-78	-4	50	12	-12	-22	-42	-14	9	-16	27
13	-41	-56	22	47	8	-38	-33	-36	2	.	13	.
14	-23	-49	.	30	0	.	-43	-27	7	16	31	45
15	3	-28	.	16	-24	.	-31	-26	8	20	43	21
16	.	-3	58	5	-38	.	-9	-36	9	.	65	36
17	31	18	37	1	.	.	5	-48	5	34	.	48
18	22	54	11	-29	.	.	13	-44	-1	42	59	59
19	37	48	-9	-49	.	.	7	-50	.	.	30	37
20	22	24	-30	-75	-16	23	7	-33	4	55	18	18
21	-1	.	-49	-79	0	21	5	-21	3	35	32	9
22	-18	-23	-50	-59	24	16	4	-14	19	40	27	-15
23	-49	-49	-62	-37	51	6	-1	5	20	28	-3	.
24	.	-69	.	-21	52	3	1	31	25	27	-20	-54
25	.	-79	-13	-9	48	3	5	43	23	18	-26	-64
26	.	-73	10	1	30	-7	18	42	24	2	-32	-70
27	-34	-53	13	27	12	-13	.	40	29	-17	-63	-64
28	.	-28	6	14	3	-6	.	29	30	-48	-51	-27
29		.	13	-10	-5	14	41	15	17	-61	-36	12
30		.	18	-20	-10	27	41	2	-3	-65	-22	.
31		.		-27		33	35		-16		-21	.

Dot symbol entry indicates no data available for the day.

BOULDER GEOMAGNETIC SUBSTORM LOG

JANUARY 1979

DATE	ONSET TIME	DIRECTION	COMMENTS
01	0400	East	
	0925		Weak SS
	0945		Weak SS
	1340		Weak SS
	2115		Positive impulse H-Component mid and low latitude stations.
02	1130	West	Strong SS; start of unsettled field lasting through 2400 UT.
03			Field generally unsettled all day.
	0730	West	SS centered near Ft Smith.
	1140	West	Strong SS
04			Minor Magstorm conditions 04/0200 UT to 05/0700 UT. Only significant SS listed.
	0420	≈ center	Strong SS
	0725	West	Strong SS
05	0500	East	
	1600		Slow onset
06	1110	West	Strong SS
	1445		
	1740		Weak SS
07			0840-2100 UT, Magstorm conditions.
08			Quiet day, few minor perturbations.
09			Positive impulse of 30-45 gamma H-Component of all mid and low latitude stations.
	0730	West	1st of double onset, weak SS.
	0750	West	2nd of double onset, weak SS.
	1145	West	Slow onset, weak SS
10			Quiet day
11	1000		Weak SS
12	1300		Slow onset. Few additional minor perturbations
13			Quiet day
14			Unsettled field 0630-1700 UT
	0755	Center	
15	0830	West	
	1050	West	Balance of day unsettled with no distinct SS onset.
16	0435	East	
	0820	West	1st of double onset.
	0910	West	2nd of double onset.
	1255	West	Slow onset.
17	1240	West	
	1610	--	
18	1035	West	
	1320	West	
	1540	West	
19	0320	East	1st of multiple onset
	0350	East	2nd of multiple onset
	0420	East	3rd of multiple onset
	1010	West	

DATE	ONSET TIME	DIRECTION	COMMENTS
20			Unsettled field 0400-1900 UT.
	0450	East	
	0820	West	1st of double onset
	0905	West	2nd of double onset
21			Unsettled field 0800-1700 UT
	0825	West	Weak SS
	0945	West	
	1100	West	
22	1225	West	
			Unsettled field after 1845 UT.
23	0925	West	Onset of Magstorm conditions lasting through 24/0400 UT.
	1115	West	
	1505		
24	0140		Strong electrojet discharge located between Lynn Lake and Boulder, far south of normal oval current system.
	0805	West	
	1100	West	
25	0140		Sudden positive impulse H-component all mid and low latitude stations. Field generally disturbed through 27 January.
	0255	East	
	0820	West	
	1215	West	1st of multiple onset.
	1245	West	2nd of multiple onset.
	1320	West	3rd of multiple onset
	1425	West	4th of multiple onset
	1515	West	
	1720		
26	0630	East	SS centered near Lynn Lake
	0955	West	1st of double onset
	1030	West	2nd of double onset
	1140	West	
	1530		
	1850		
	1905		
	2300		
27	0425	East	1st of double onset
	0500	East	2nd of double onset
	0600	East	
	1450		
	1555		
28	1030	West	1st of double onset
	1045	West	2nd of double onset
	1125	West	
	1840		
29	1220	West	
	1530		Slow onset
30			Unsettled field 0700-1600 UT.
	1240	West	
31	0745		Weak SS
	1115	West	
	1350		Slow onset

DECEMBER 1978 DATA

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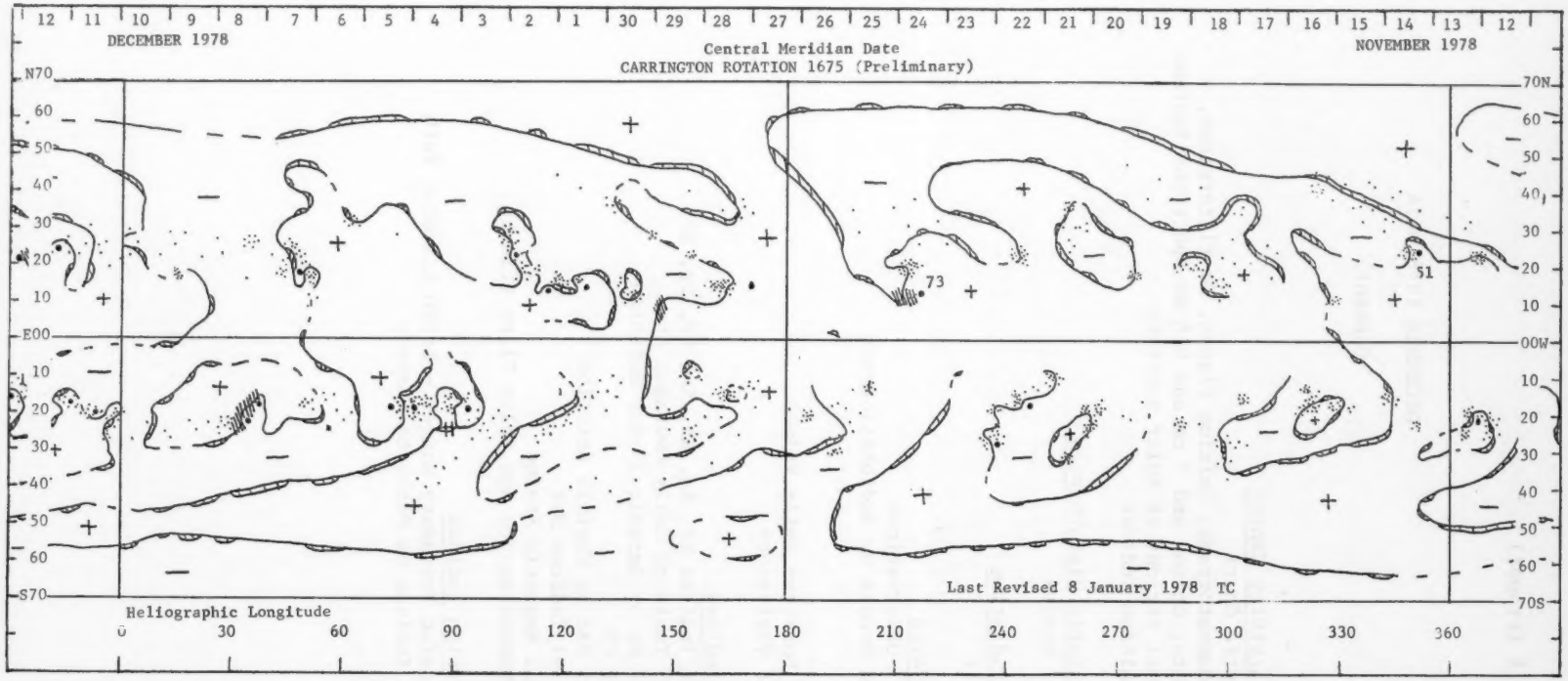
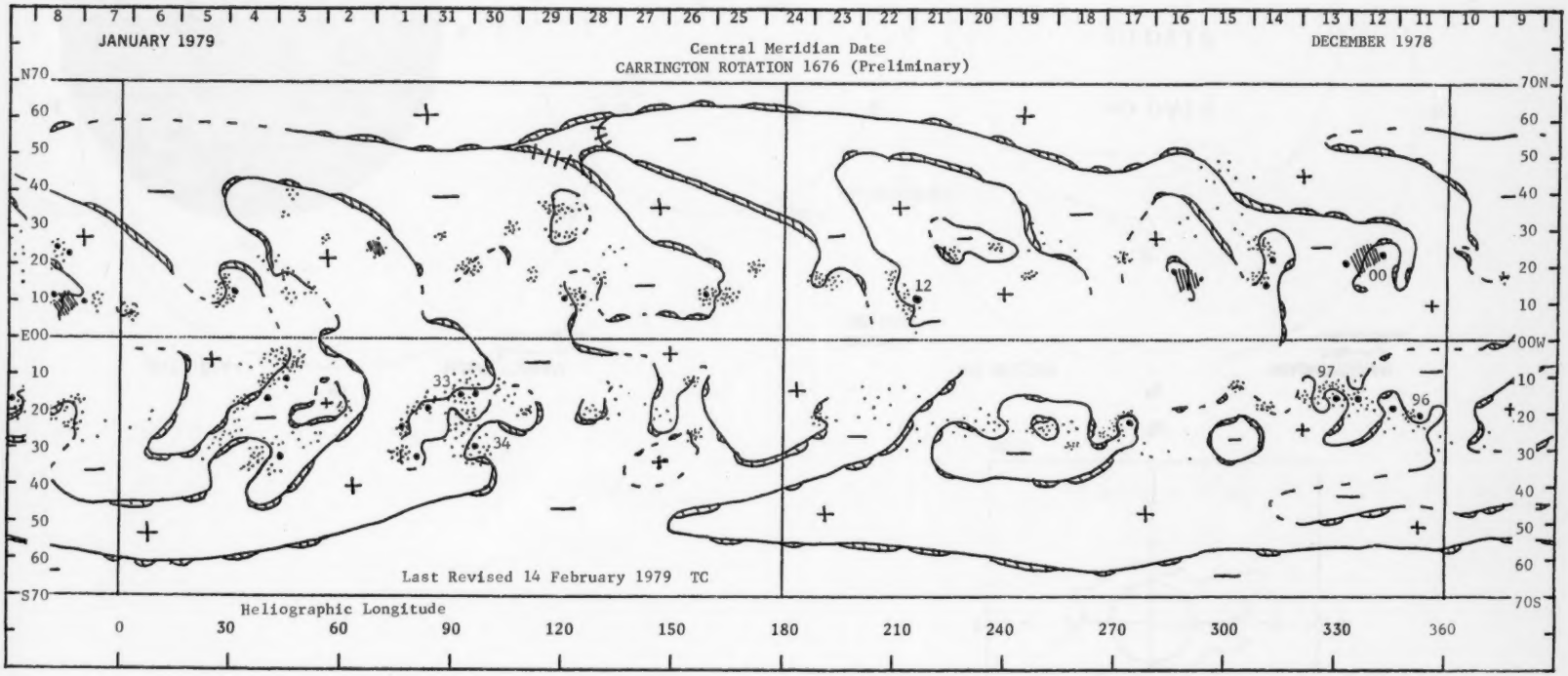
Hα SYNOPTIC CHART

CARRINGTON ROTATION 1675 (PRELIMINARY)



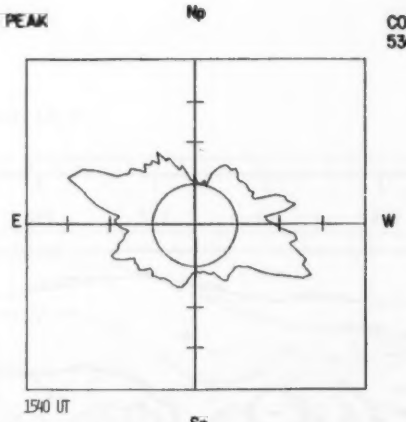
Hα SYNOPTIC CHART

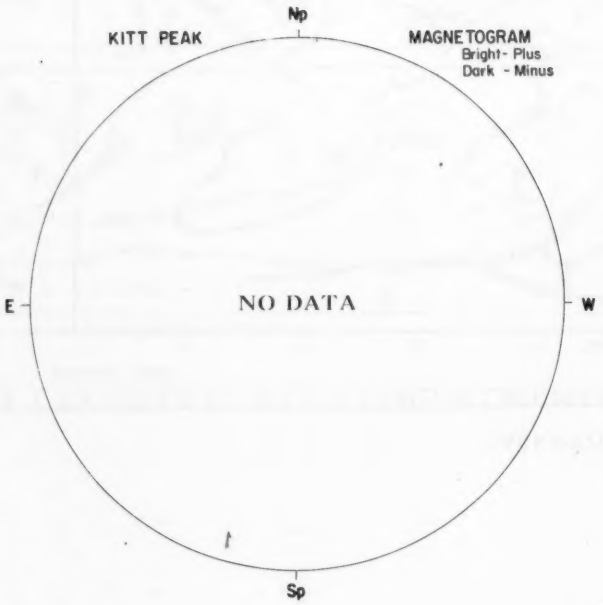
CARRINGTON ROTATION 1676 (PRELIMINARY)

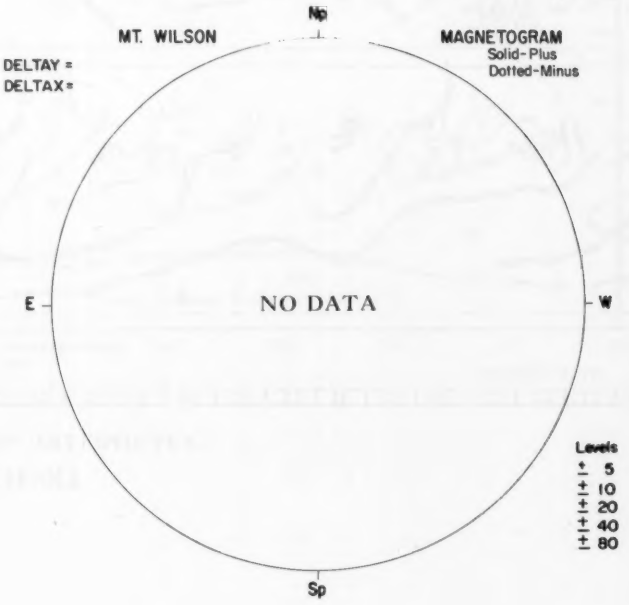


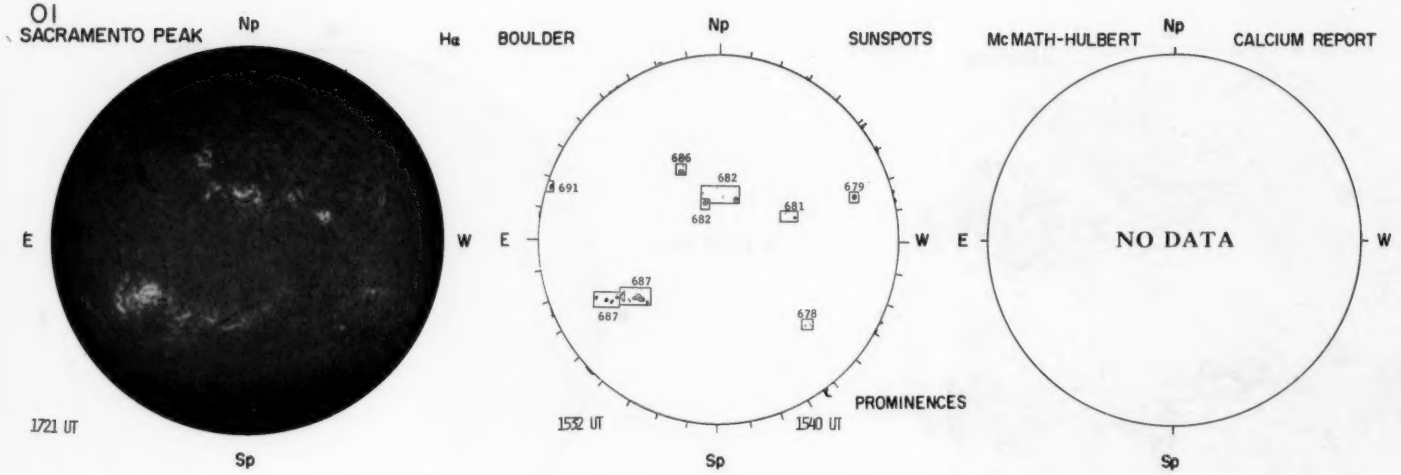
DECEMBER 1, 1978 (P = 16.25, B_o = 0.89, L_o = 131.17)

SACRAMENTO PEAK





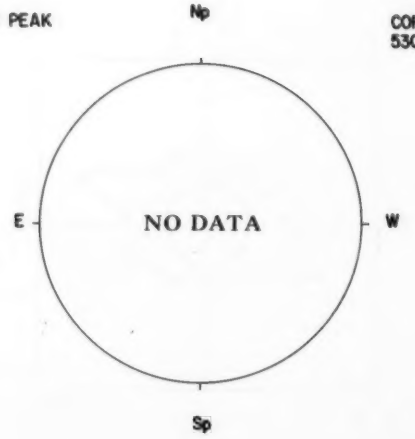



01
SACRAMENTO PEAK
Np
E
W
Sp
1721 UT
Hα
BOULDER
Np
691
686
682
682
681
679
687
687
678
E
W
Sp
1532 UT
1540 UT
SUNSPOTS
PROMINENCES
McMATH-HULBERT
Np
CALCIUM REPORT
NO DATA
E
W
Sp

DECEMBER 2, 1978 (P = 15.87, B_o = 0.76, L_o = 117.99)

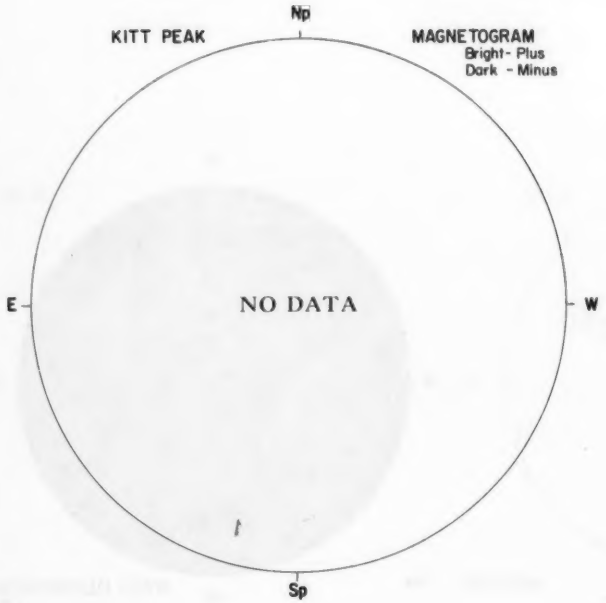
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

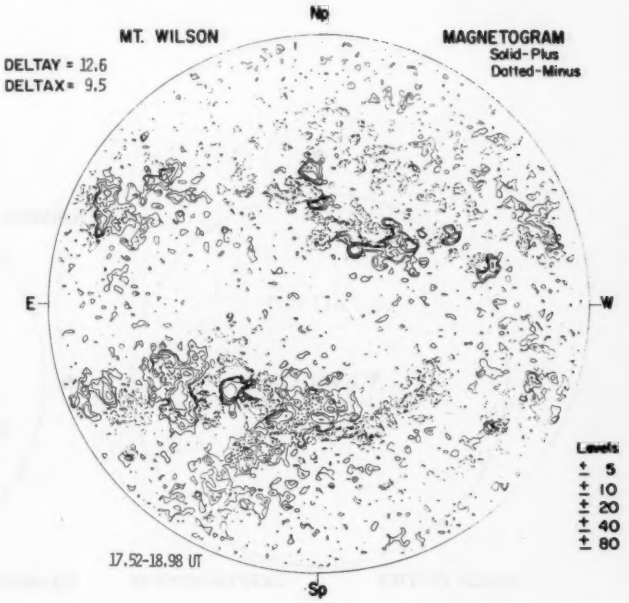
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

DELTAY = 12.6
DELTAX = 9.5

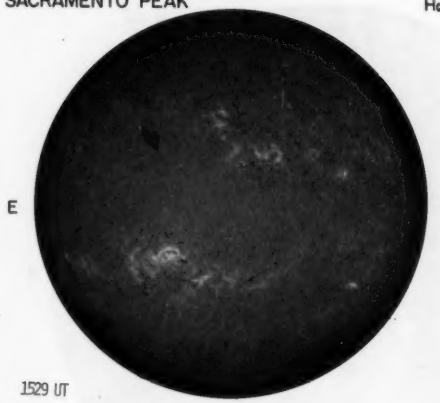
MAGNETOGRAM
Solid - Plus
Dotted - Minus



02

SACRAMENTO PEAK Np

Hα



E W

1529 UT

Sp

BOULDER Np

SUNSPOTS

E NO DATA W

PROMINENCES

Sp

McMATH-HULBERT Np

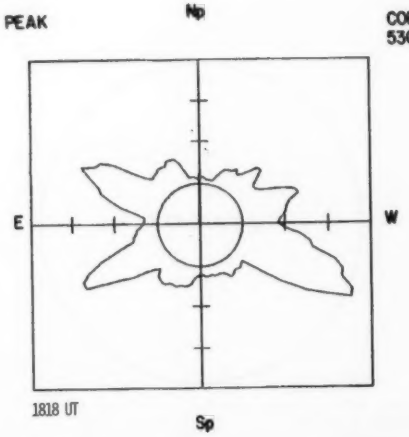
CALCIUM REPORT

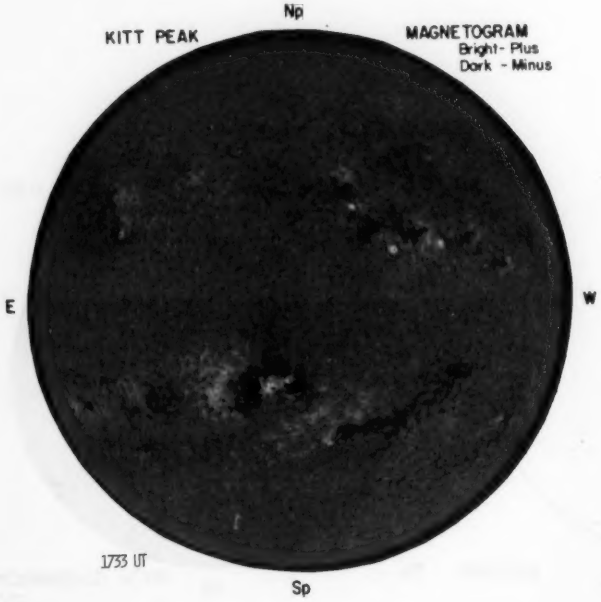
E NO DATA W

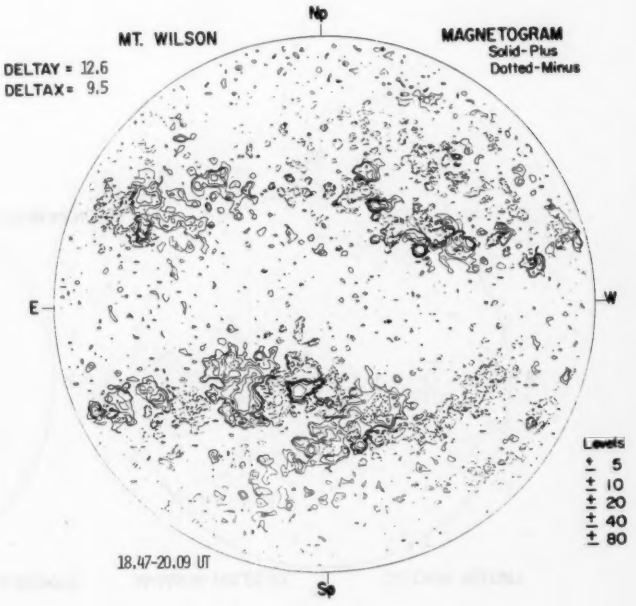
Sp

DECEMBER 3, 1978 (P = 15.47, B_o = 0.63, L_o = 104.81)

SACRAMENTO PEAK

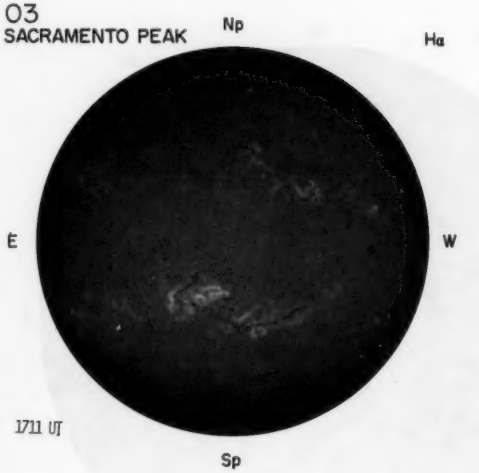




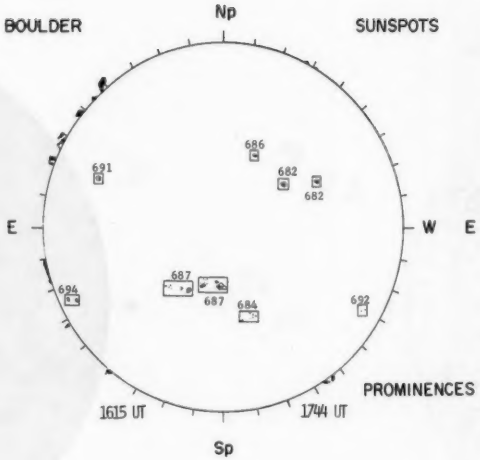


03

SACRAMENTO PEAK



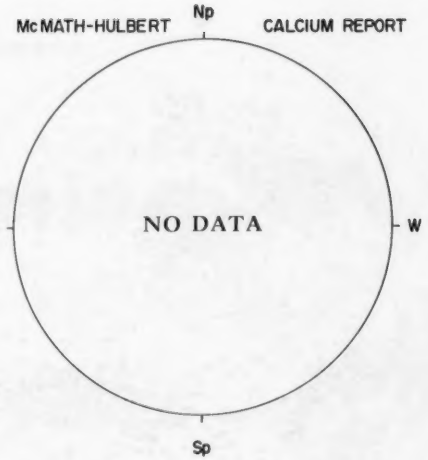
Hα BOULDER



SUNSPOTS

PROMINENCES

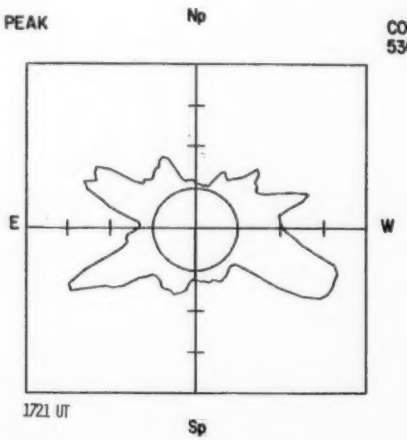
McMATH-HULBERT

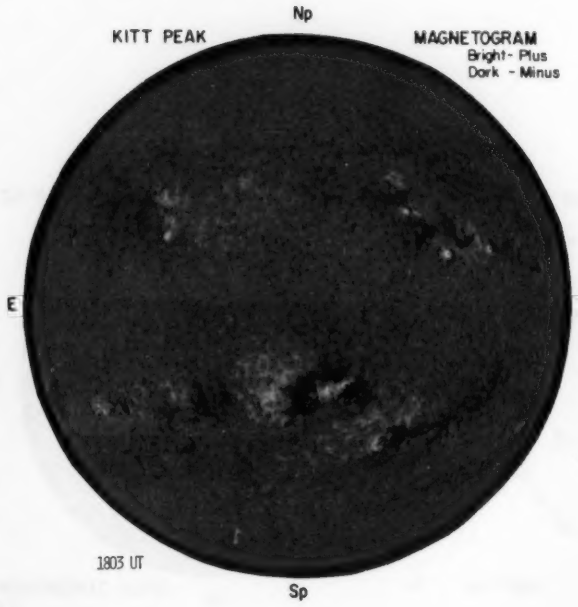


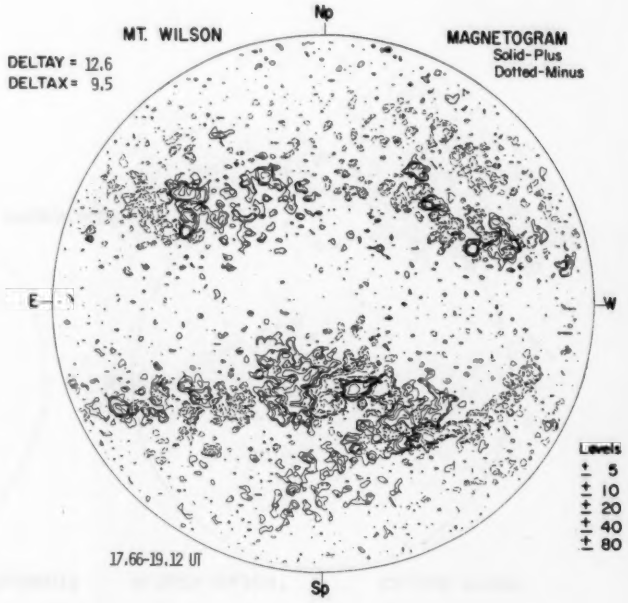
CALCIUM REPORT

DECEMBER 4, 1978 (P = 15.08, B_o = 0.50, L_o = 91.64)

SACRAMENTO PEAK

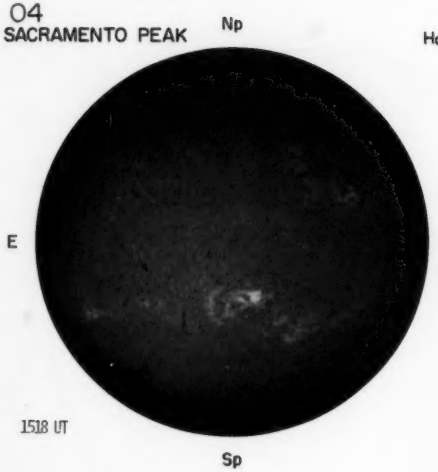




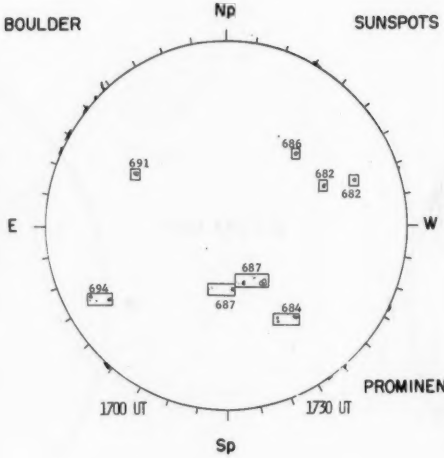


04

SACRAMENTO PEAK



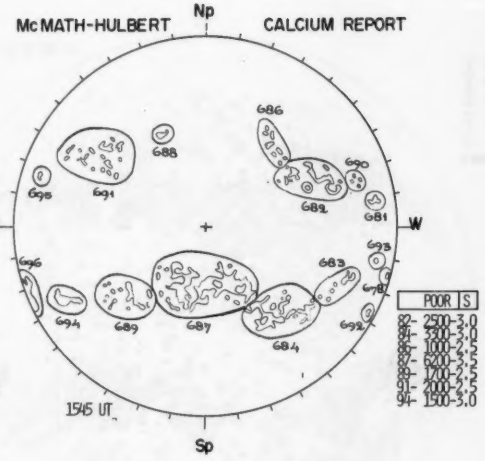
Hα BOULDER



SUNSPOTS

PROMINENCES

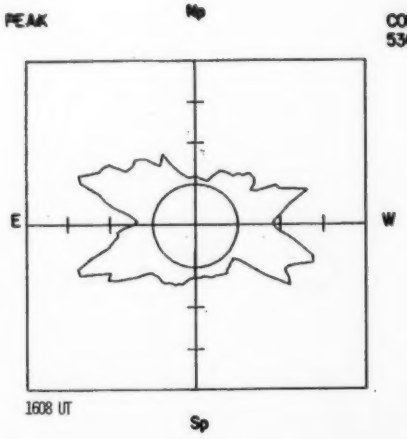
McMATH-HULBERT CALCIUM REPORT



DECEMBER 5, 1978 (P = 14.67, B_o = 0.38, L_o = 78.46)

SACRAMENTO PEAK

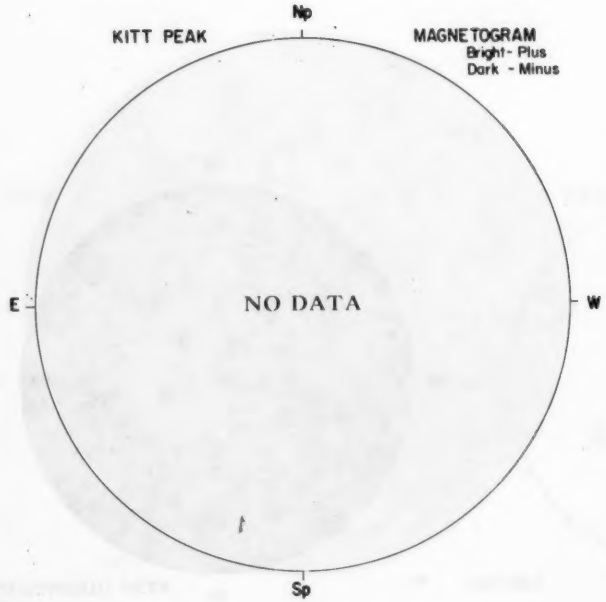
CORONA (1.15 $R_\odot$)
5303 Å



1608 UT

KITT PEAK

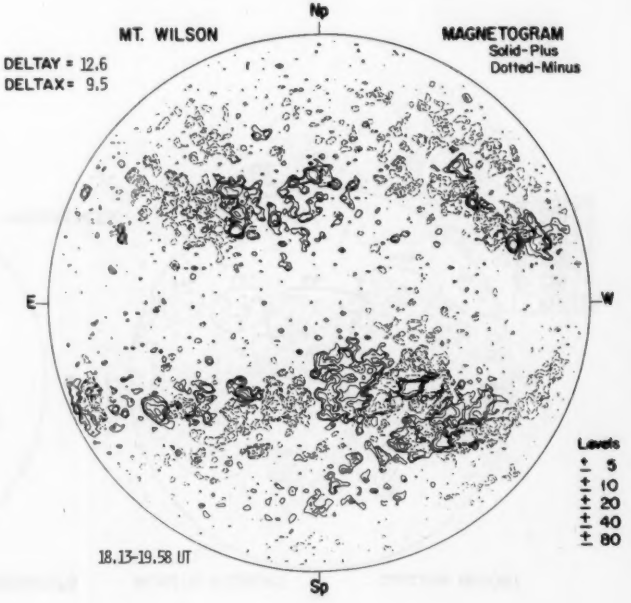
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

DELTAY = 12.6
DELTAX = 9.5

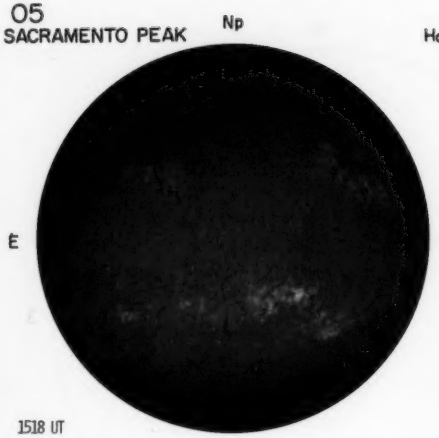
MAGNETOGRAM
Solid - Plus
Dotted - Minus



18.13-19.58 UT

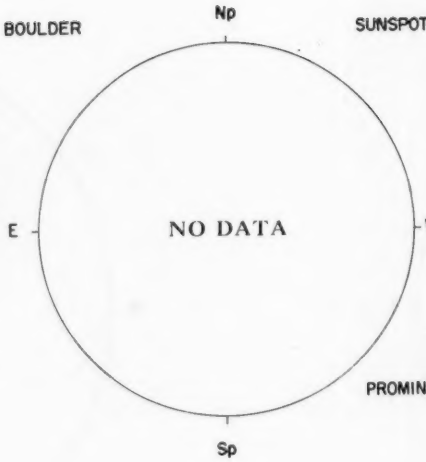
05

SACRAMENTO PEAK



1518 UT

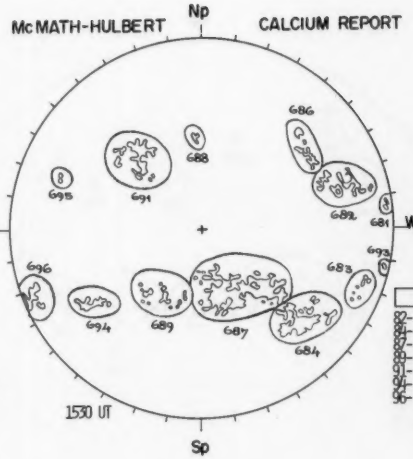
Hα BOULDER



SUNSPOTS

PROMINENCES

McMATH-HULBERT



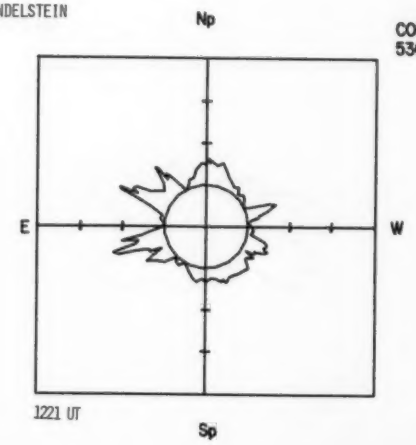
1530 UT

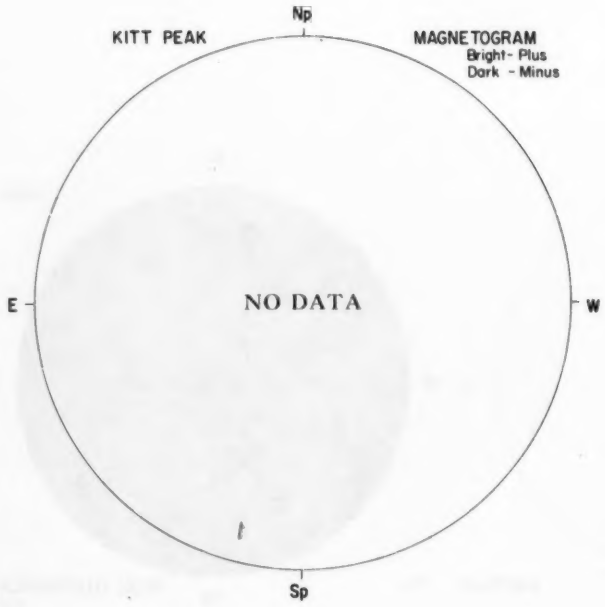
CALCIUM REPORT

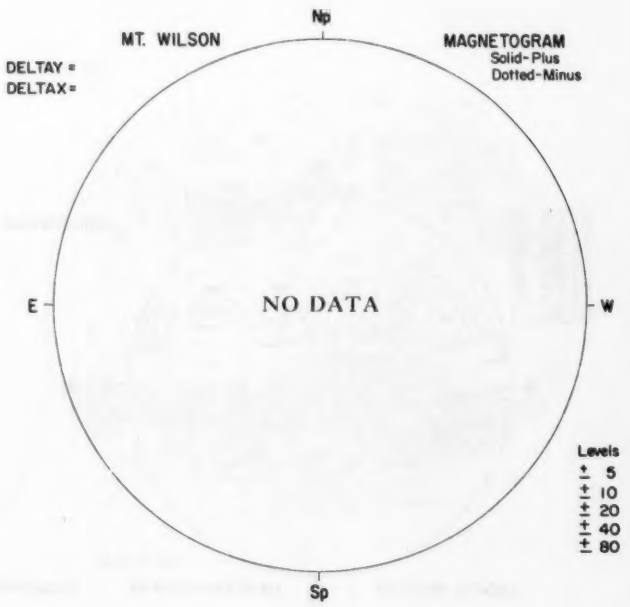
	POOR	M
682	2500	3.0
688	3000	3.0
691	3500	3.5
695	1500	2.5
686	2000	2.5
693	1200	3.0
696	2400	2.5

DECEMBER 6, 1978 (P = 14.26, B_o = 0.25, L_o = 65.28)

WENDELSTEIN



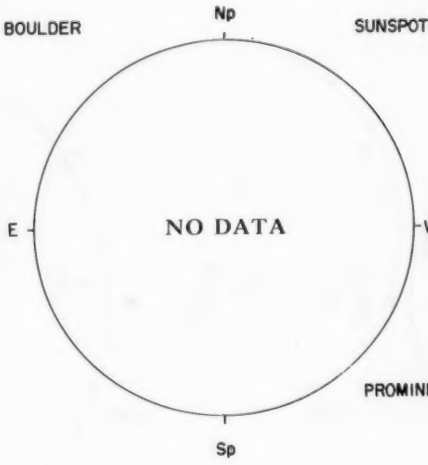




06

SACRAMENTO PEAK

Hα BOULDER

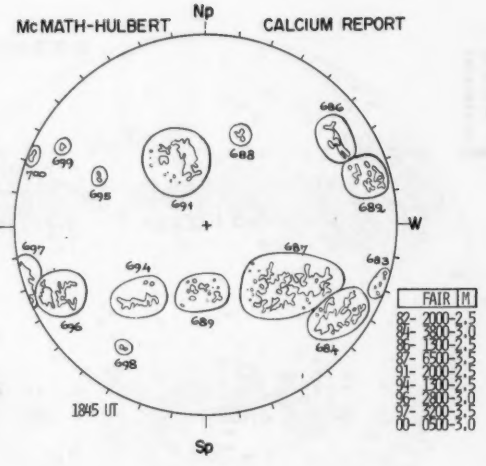


SUNSPOTS

PROMINENCES

McMATH-HULBERT

CALCIUM REPORT

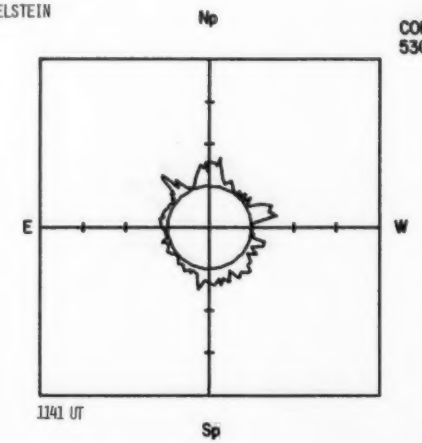


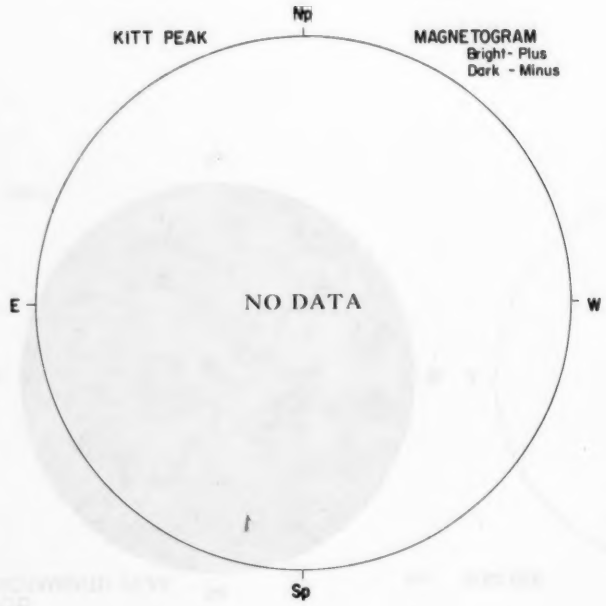
FAIR IM

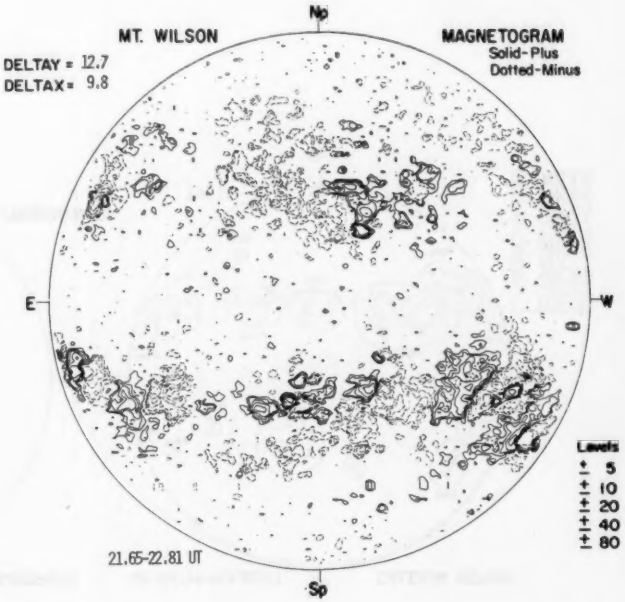
82- 2000-2.5
84- 1300-3.0
86- 1300-2.5
88- 0500-3.5
91- 2000-2.5
94- 1300-2.5
96- 2300-3.0
97- 2200-3.5
00- 0500-3.0

DECEMBER 7, 1978 (P = 13.85, B_o = 0.12, L_o = 52.10)

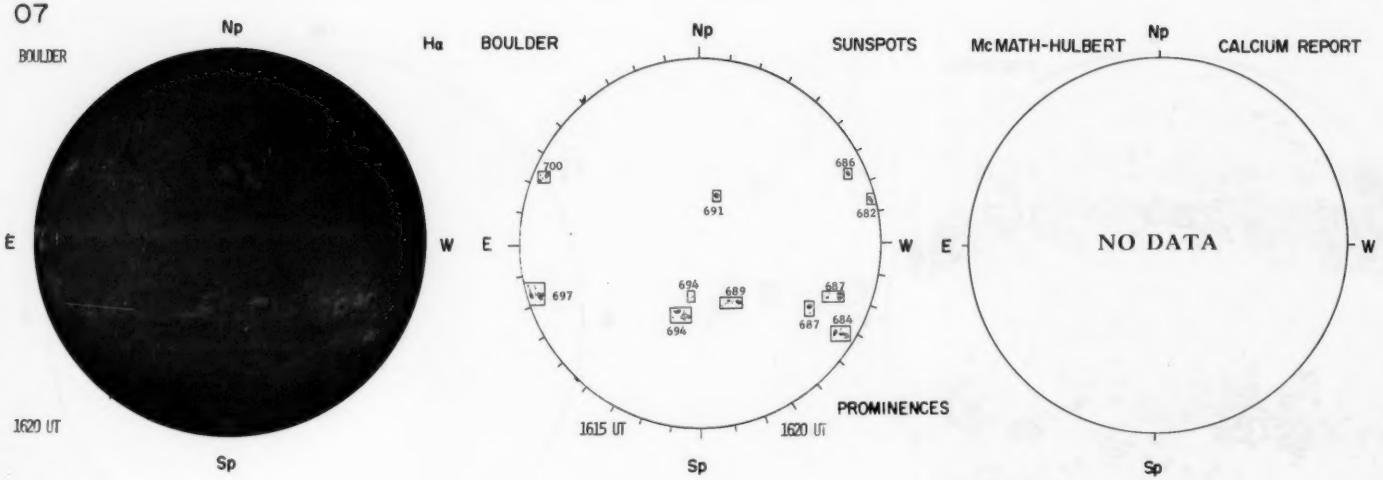
WENDELSTEIN





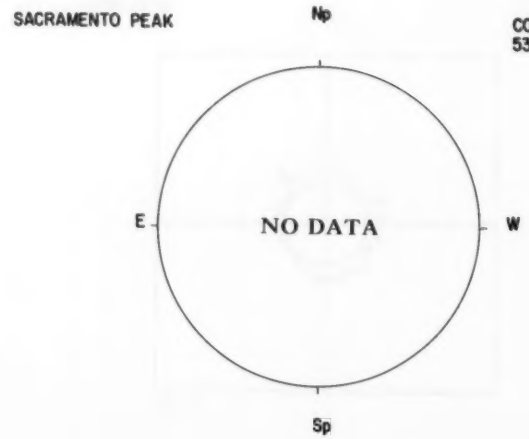


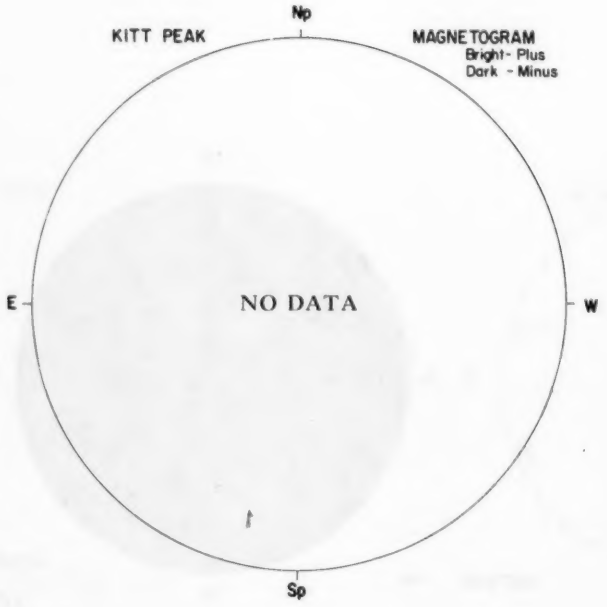
07

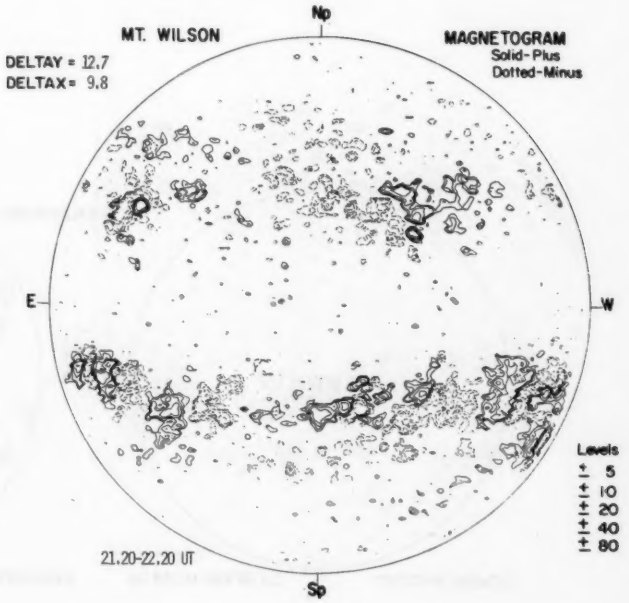

Np
BOULDER
E
W
1620 UT
Sp
Hα BOULDER
Np
E
W
700
686
691
682
697
694
689
687
694
687
684
1615 UT
1620 UT
Sp
SUNSPOTS
PROMINENCES
McMATH-HULBERT
Np
E
NO DATA
W
Sp
CALCIUM REPORT

DECEMBER 8, 1978 (P = 13.43, B_o = -0.01, L_o = 38.93)

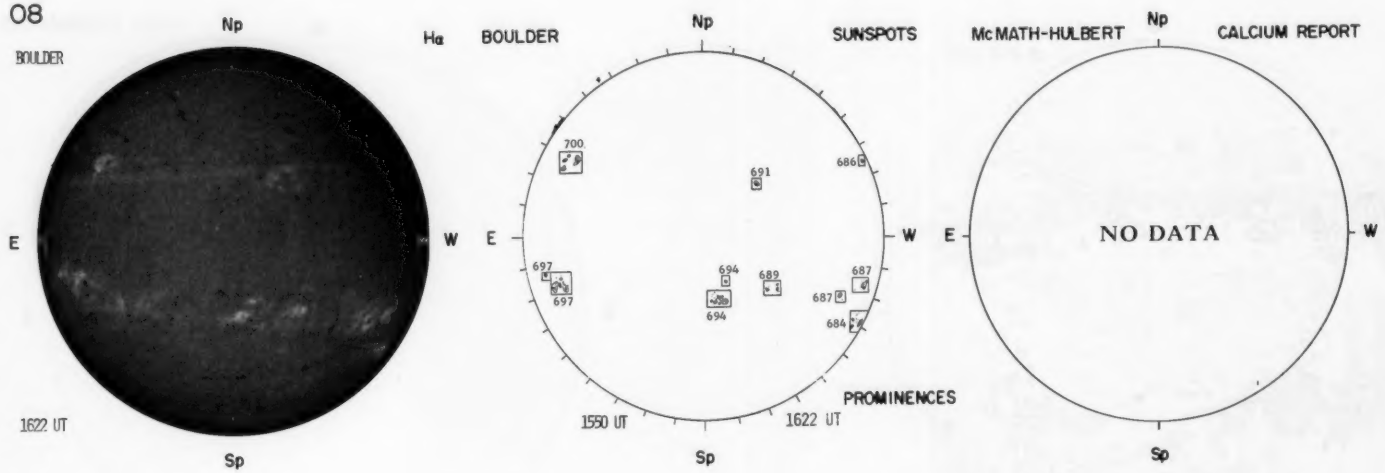
SACRAMENTO PEAK





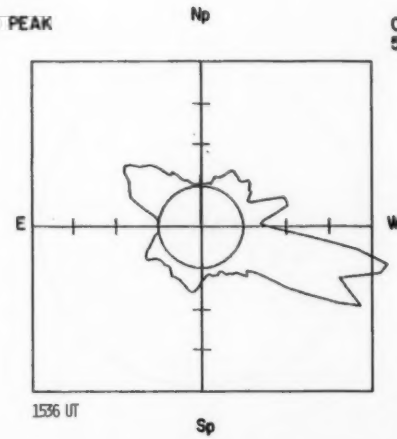


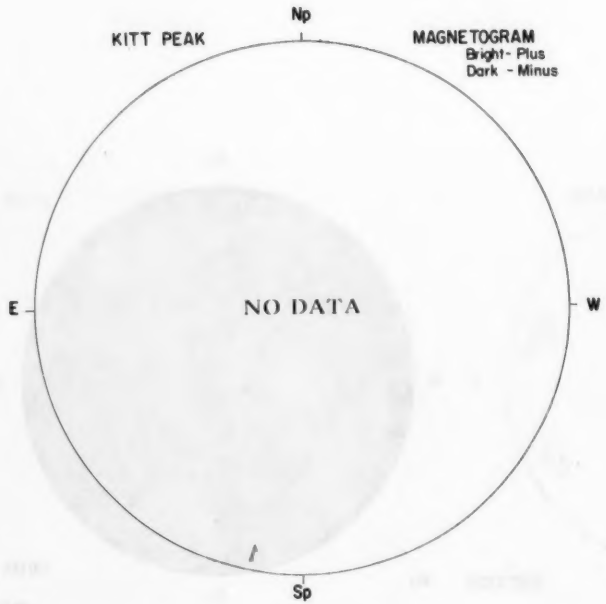
08

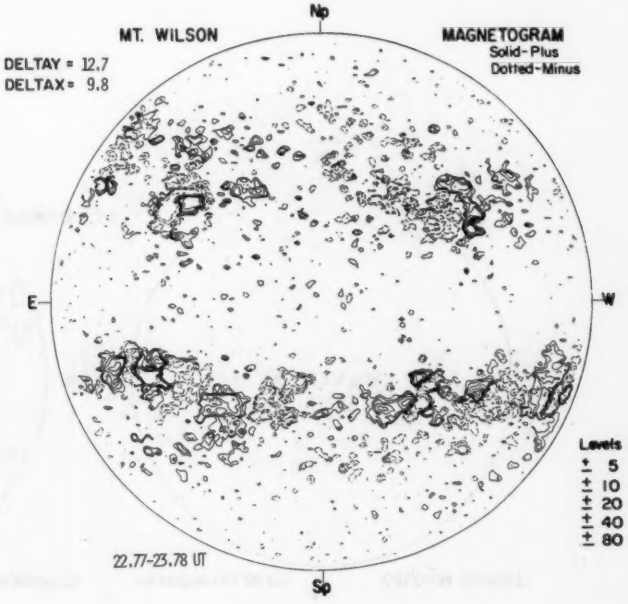

Np
BOULDER
E
W
Sp
1622 UT
Hα BOULDER
Np
E
W
Sp
700
691
686
697
697
694
694
689
687
687
684
1550 UT
1622 UT
PROMINENCES
SUNSPOTS
McMATH-HULBERT
Np
E
W
Sp
NO DATA
CALCIUM REPORT

DECEMBER 9, 1978 (P=13.01, B_0=-0.14, L_0=25.75)

SACRAMENTO PEAK

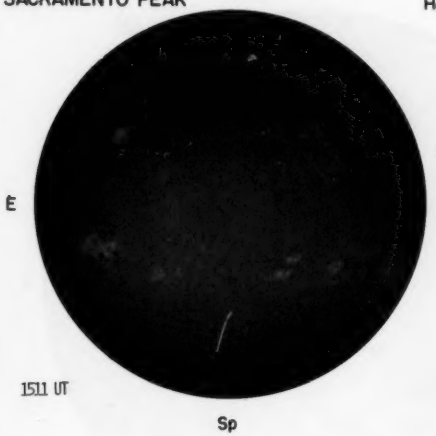




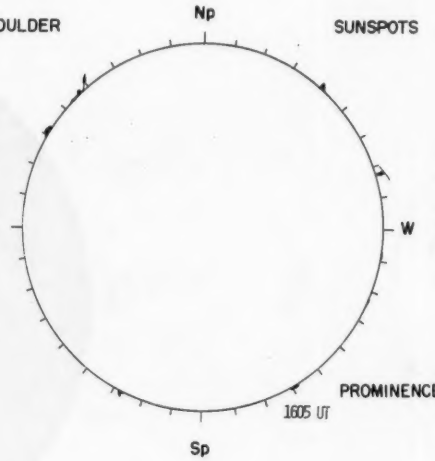


09

SACRAMENTO PEAK



Hα BOULDER

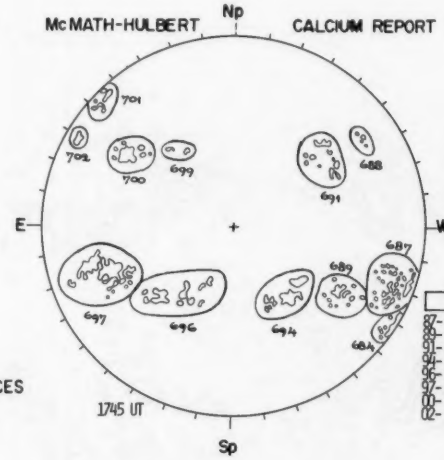


SUNSPOTS

PROMINENCES

McMATH-HULBERT

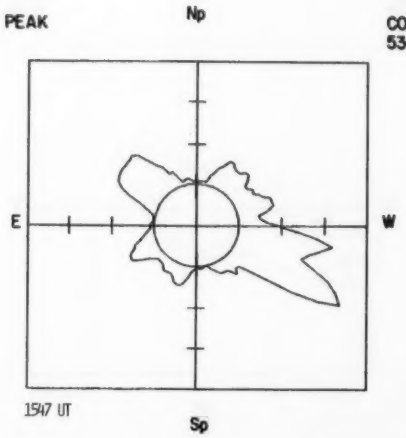
CALCIUM REPORT

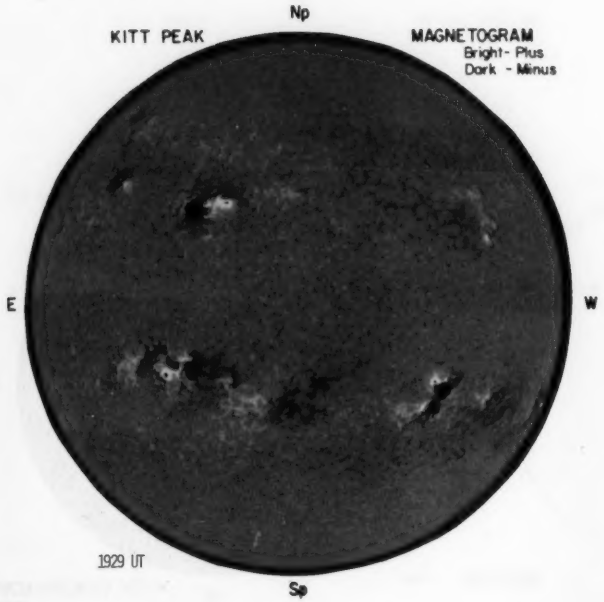


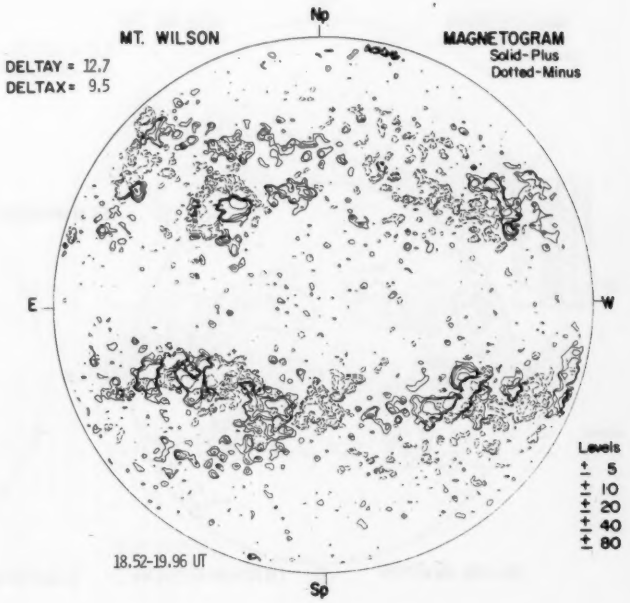
FAIR	D
97- 3700	2.5
98- 1200	3.0
01- 1400	2.5
01- 2200	3.0
96- 2400	2.5
97- 1500	2.5
00- 2400	3.5
02- 0700	3.5

DECEMBER 10, 1978 (P = 12.58, B_o = -0.27, L_o = 12.57)

SACRAMENTO PEAK

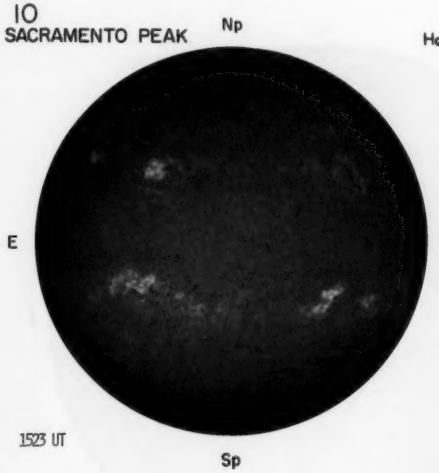




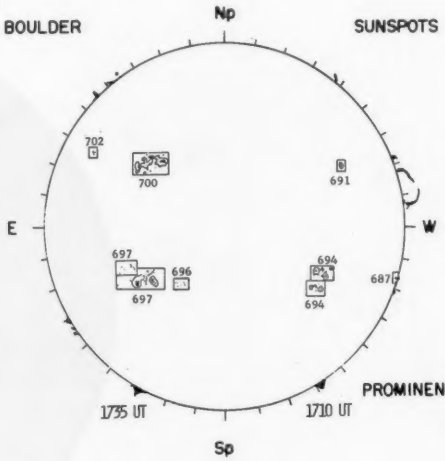


10

SACRAMENTO PEAK



Hα BOULDER

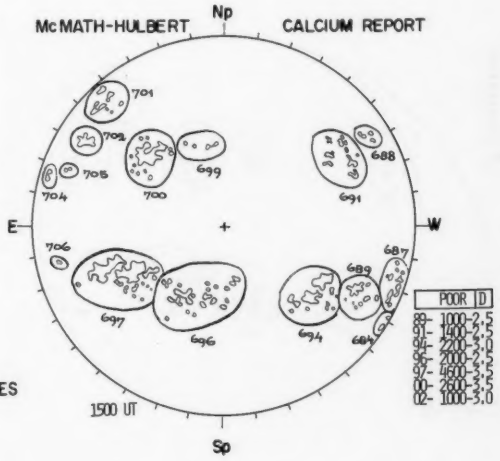


SUNSPOTS

PROMINENCES

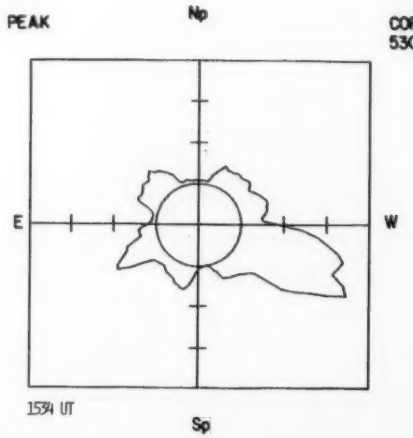
McMATH-HULBERT

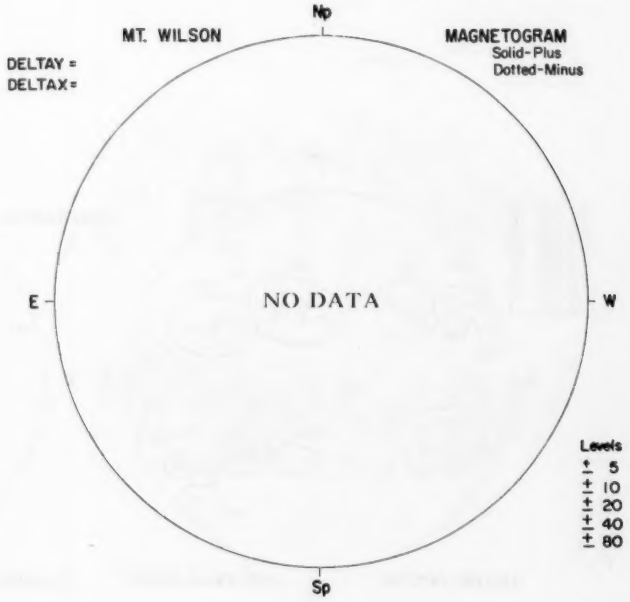
CALCULUM REPORT

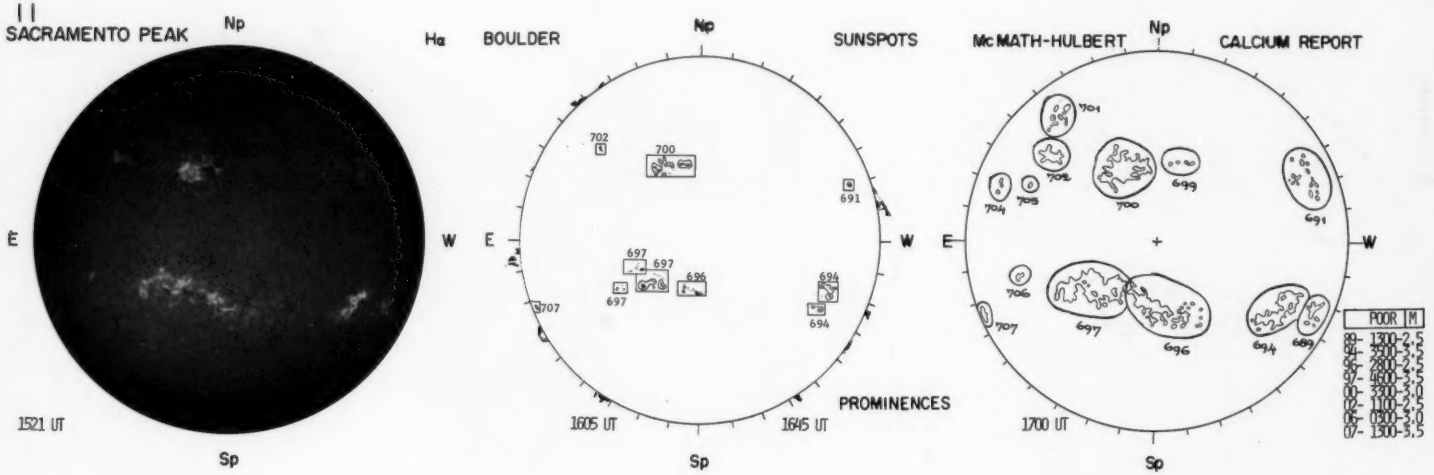


DECEMBER 11, 1978 (P = 12.14, B_o = -0.39, L_o = 359.40)

SACRAMENTO PEAK

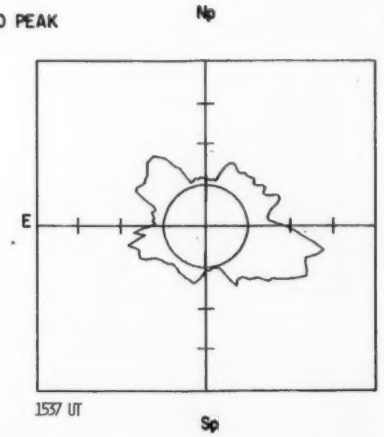


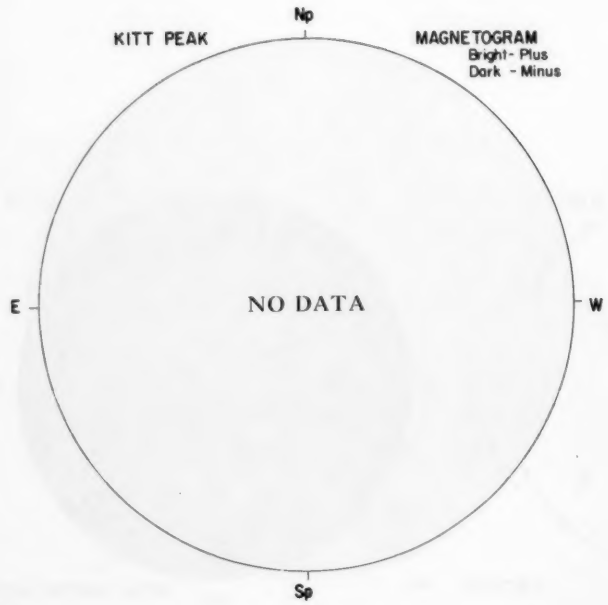


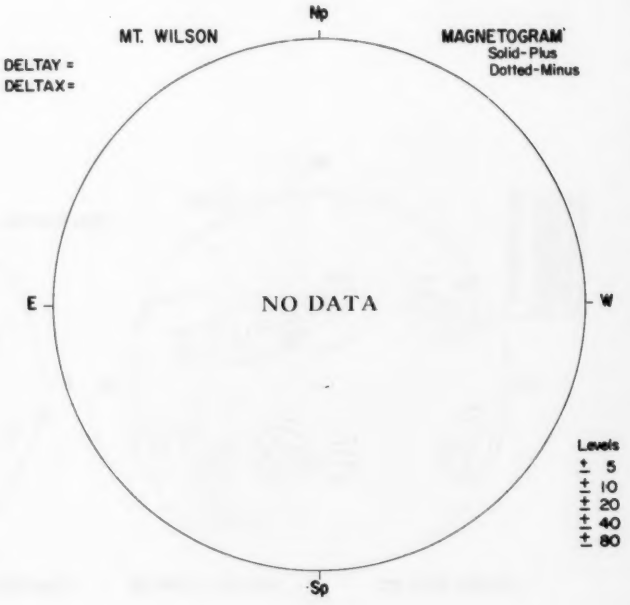

SACRAMENTO PEAK
Np
Hα
1521 UT
E
W
Sp
BOULDER
SUNSPOTS
1605 UT
1645 UT
PROMINENCES
McMATH-HULBERT
CALCIUM REPORT
1700 UT
POOR M
00- 1300-2.5
01- 2300-3.5
02- 2800-2.5
03- 0400-3.5
00- 3300-3.0
02- 1100-2.5
06- 0900-3.0
07- 1300-3.5

DECEMBER 12, 1978 (P = 11.71, B_o = -0.52, L_o = 346.22)

SACRAMENTO PEAK

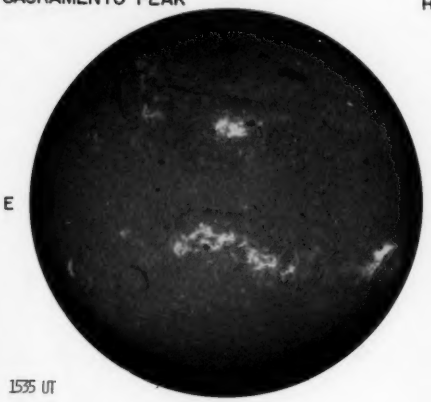




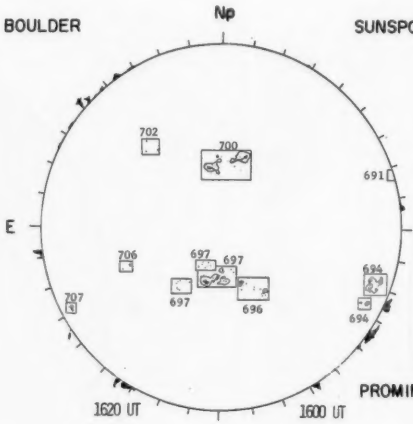


12

SACRAMENTO PEAK Np



Hα BOULDER Np

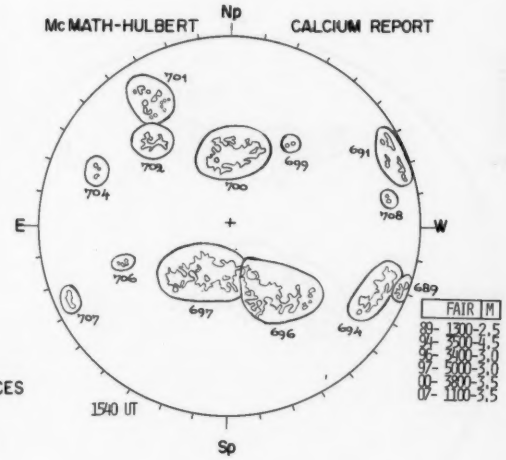


SUNSPOTS

PROMINENCES

McMATH-HULBERT Np

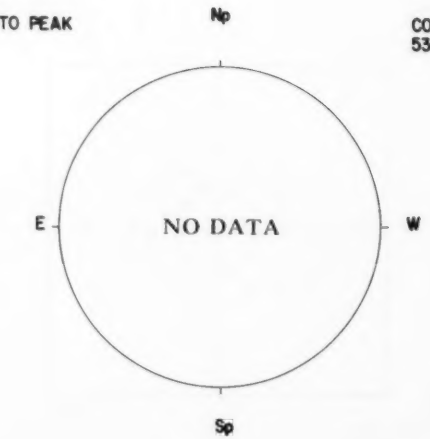
CALCIUM REPORT



DECEMBER 13, 1978 (P=11.26, B_o=-0.65, L_o=333.04)

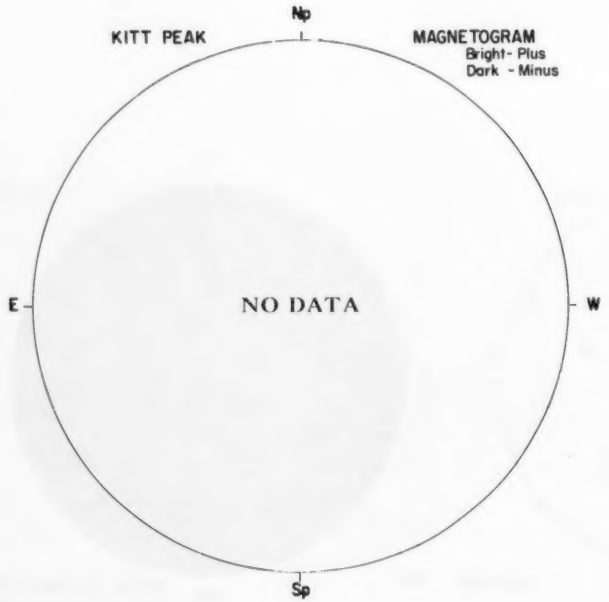
SACRAMENTO PEAK

CORONA (1.15 R_o)
5303 Å



KITT PEAK

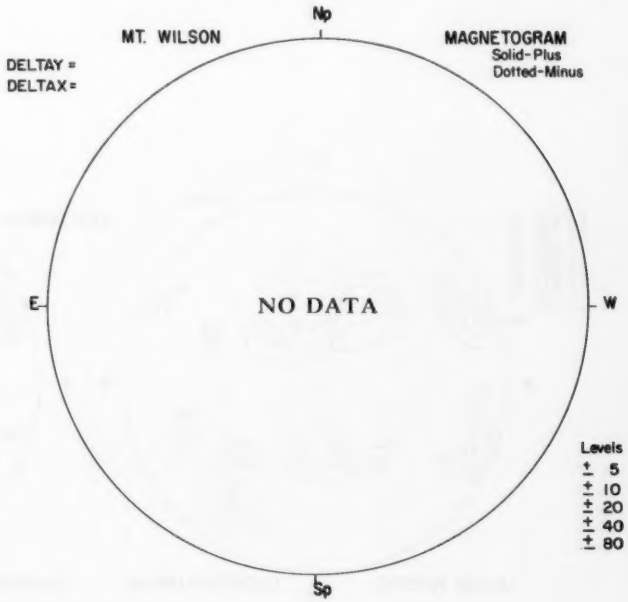
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

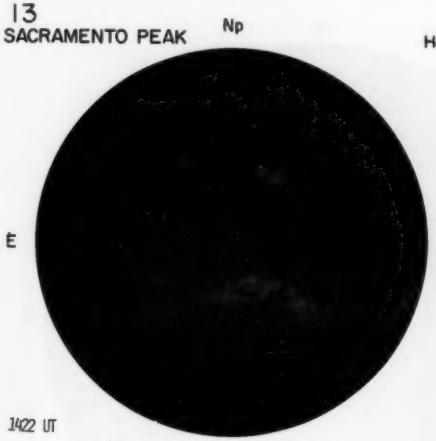
DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus

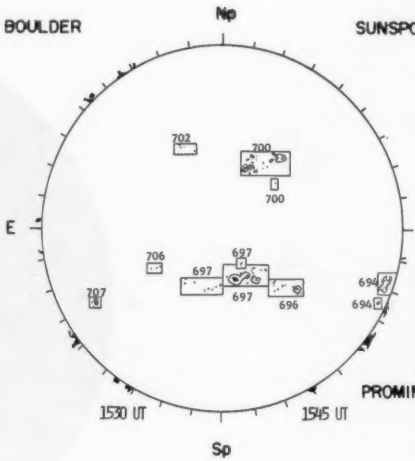


13

SACRAMENTO PEAK



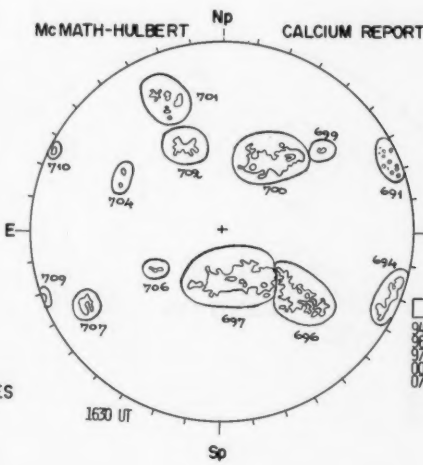
Hα BOULDER



SUNSPOTS

PROMINENCES

McMATH-HULBERT

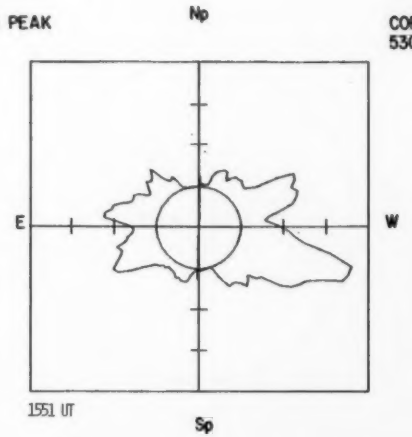


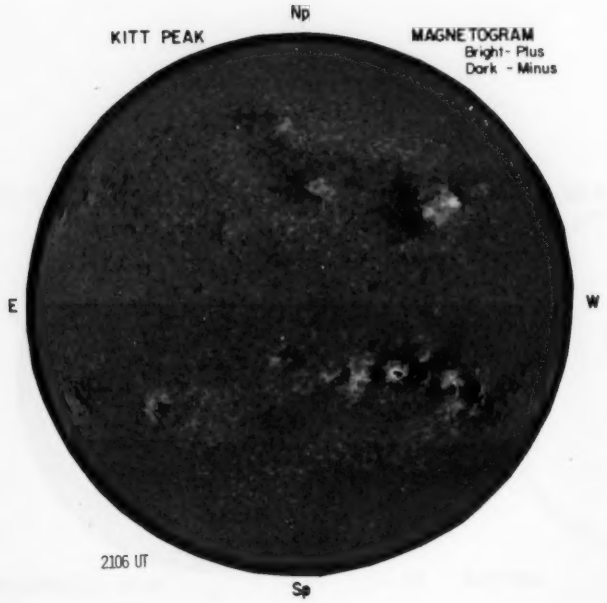
CALCIUM REPORT

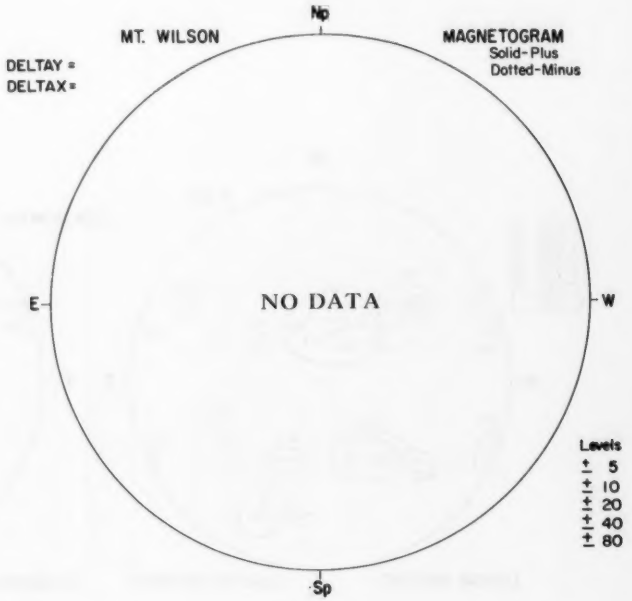
FAIR	M
96-	3700-4.0
96-	3700-3.0
97-	5800-3.0
00-	4200-3.0
07-	1100-3.5

DECEMBER 14, 1978 (P = 10.82, B_o = -0.78, L_o = 319.87)

SACRAMENTO PEAK

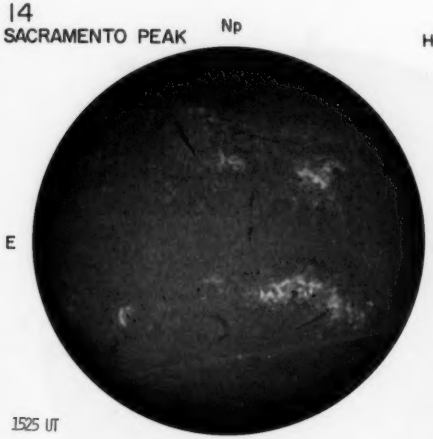




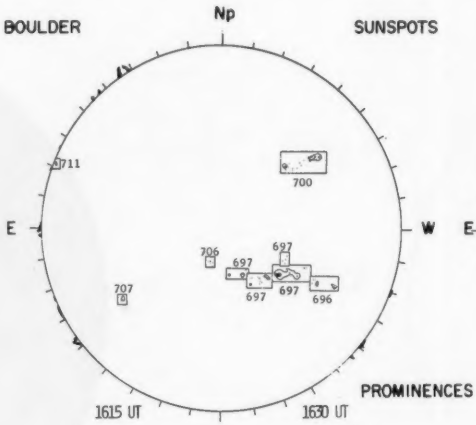


14

SACRAMENTO PEAK



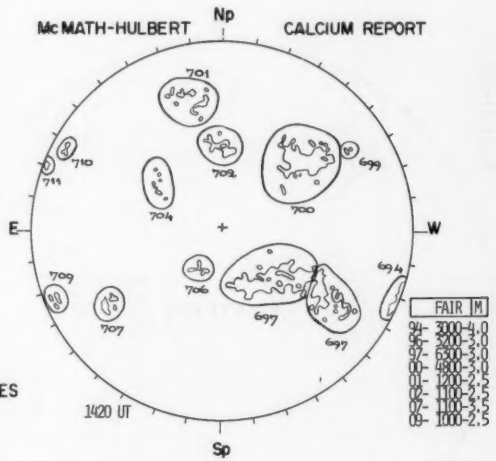
Hα BOULDER



SUNSPOTS

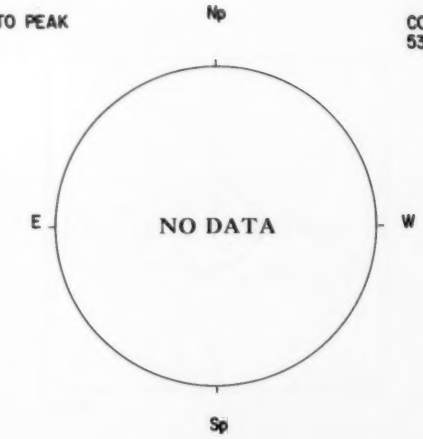
PROMINENCES

McMATH-HULBERT CALCIUM REPORT

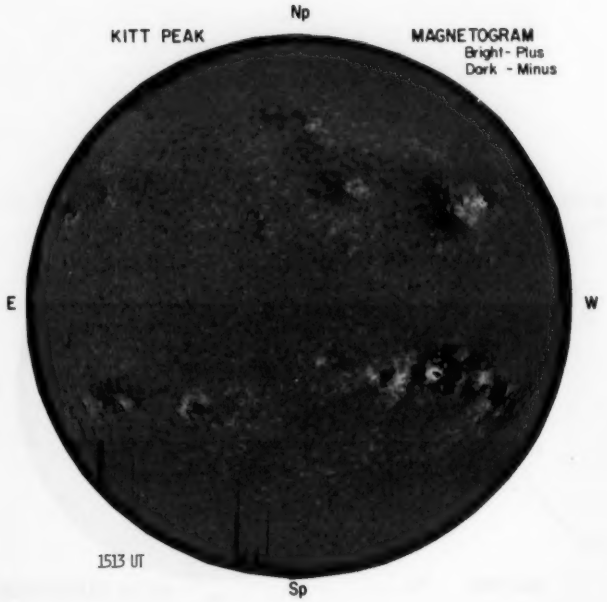


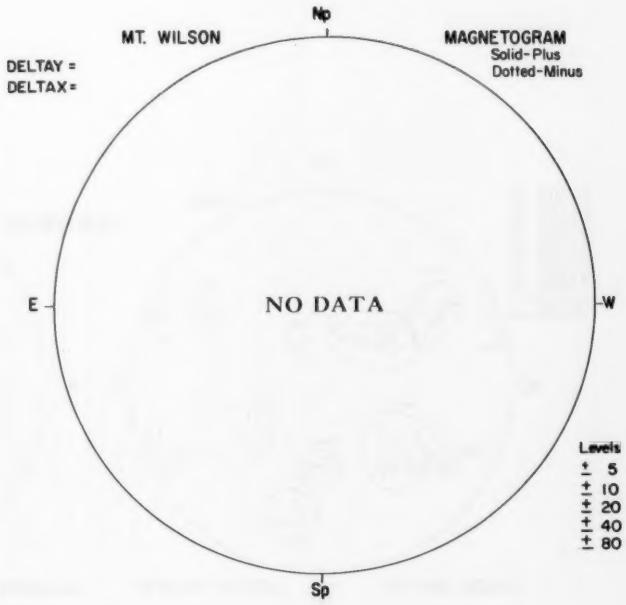
DECEMBER 15, 1978 (P = 10.37, B_o = -0.90, L_o = 306.69)

SACRAMENTO PEAK



CORONA (1.15 $R_\odot$)
5303 Å

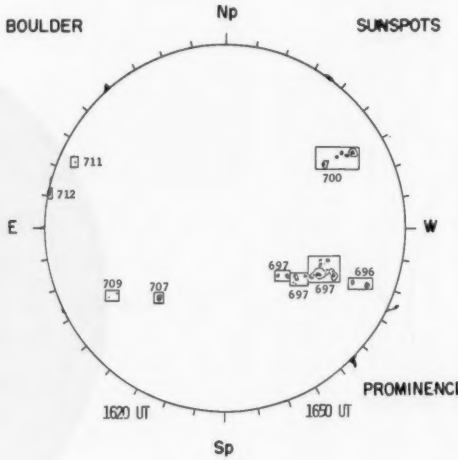




15

SACRAMENTO PEAK

Hα BOULDER

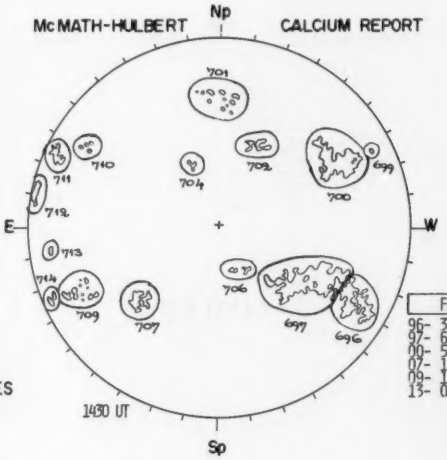


SUNSPOTS

PROMINENCES

McMATH-HULBERT

CALCIUM REPORT



FAIR	D
96- 3700-3.0	
97- 6300-3.0	
00- 5000-3.5	
07- 1100-2.0	
09- 1000-3.5	
13- 0300-2.5	

77
Dec 78

DECEMBER 16, 1978 (P = 9.92, B_o = -1.03, L_o = 293.52)

SACRAMENTO PEAK

Np

CORONA (1.15 $R_\odot$)
5303 Å

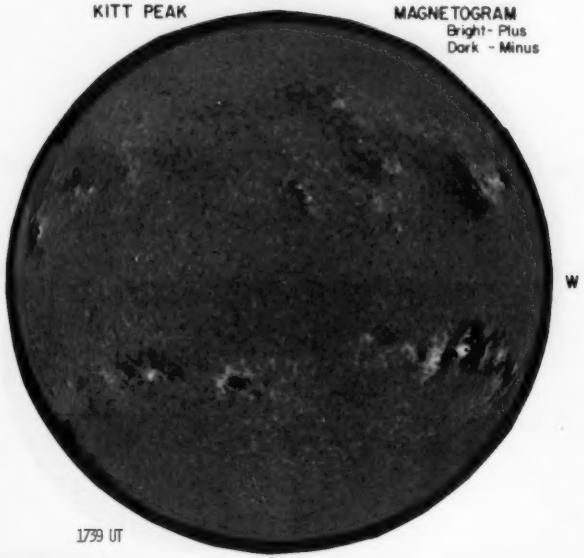
E — NO DATA — W

Sp

KITT PEAK

Np

MAGNETOGRAM
Bright - Plus
Dark - Minus



E W

1739 UT

Sp

MT. WILSON

Np

DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus

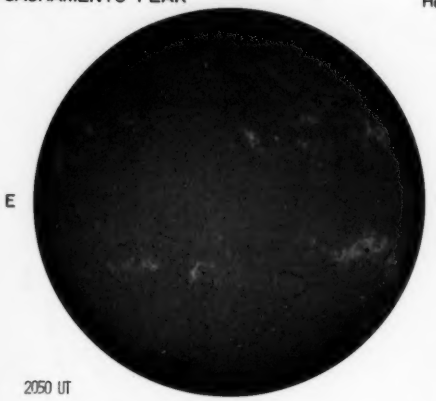
E — NO DATA — W

Levels
+ 5
+ + 10
+ + + 20
+ + + + 40
+ + + + + 80

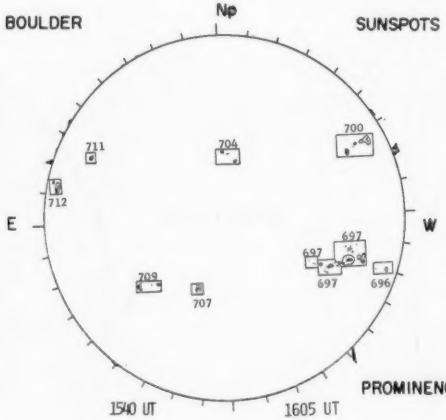
Sp

16

SACRAMENTO PEAK Np



Hα BOULDER Np

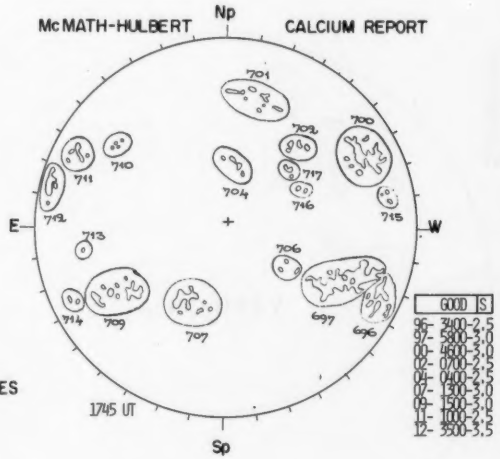


SUNSPOTS

PROMINENCES

McMATH-HULBERT Np

CALCIUM REPORT

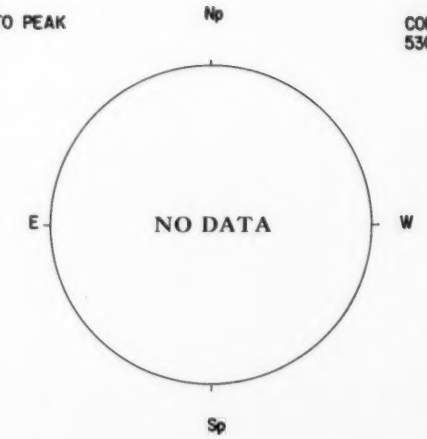


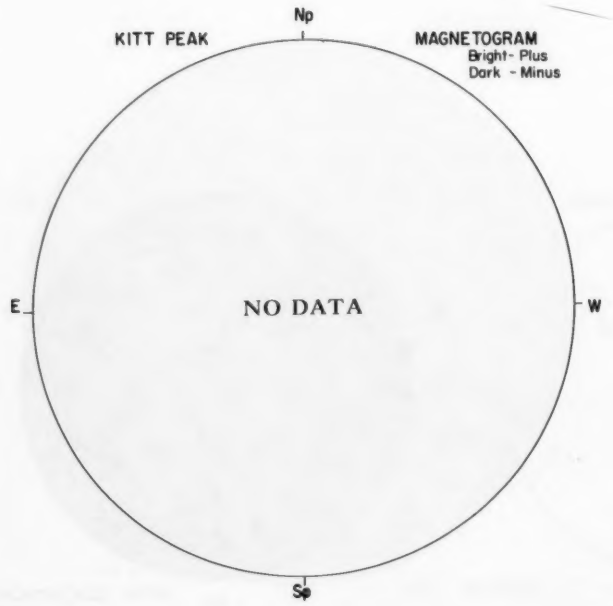
GOOD	S
06- 2400-2.5	
07- 5800-3.0	
08- 4600-3.0	
10- 0700-2.5	
11- 0400-2.5	
12- 1300-3.0	
04- 1500-3.0	
11- 1000-2.5	
12- 3500-3.5	

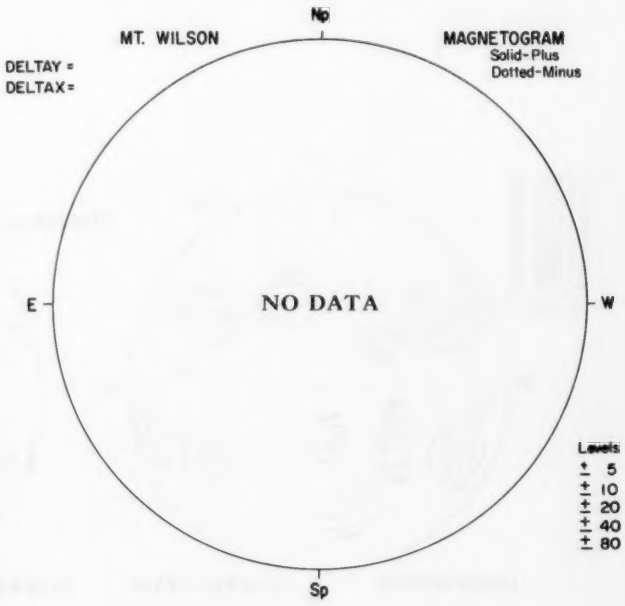
79
Dec 78

DECEMBER 17, 1978 (P = 9.46, B_o = -1.16, L_o = 280.34)

SACRAMENTO PEAK







17

SACRAMENTO PEAK Np Hα

E NO DATA W

Sp

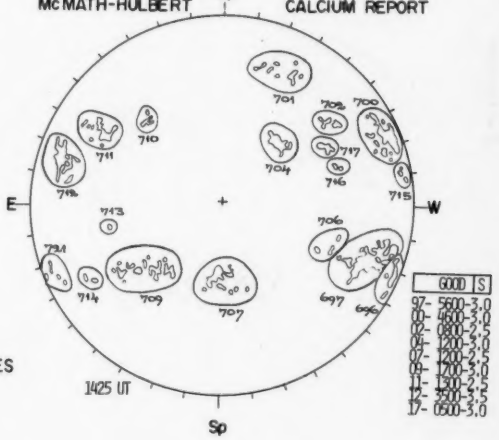
BOULDER Np SUNSPOTS

E NO DATA W

PROMINENCES

Sp

McMATH-HULBERT Np CALCIUM REPORT



6000	S
97- 5600	3.0
00- 4600	3.0
02- 0800	2.5
04- 1200	3.0
07- 1200	2.5
09- 1700	3.0
11- 1300	2.5
12- 3500	3.5
17- 0600	3.0

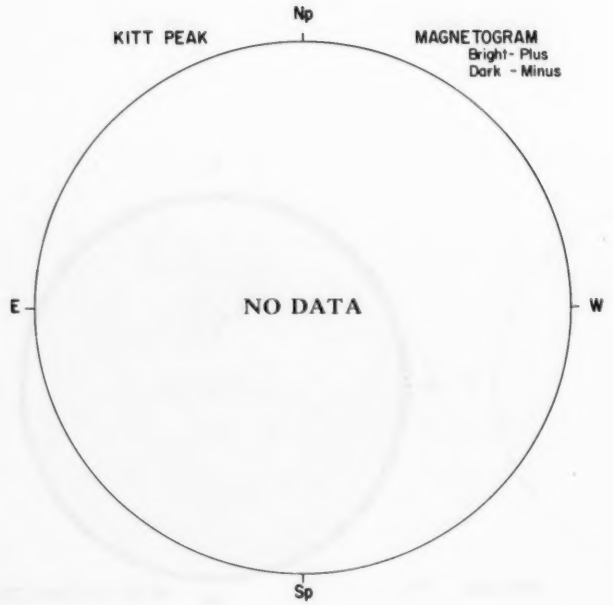
DECEMBER 18, 1978 (P = 9.00, B_0 = -1.28, L_0 = 267.17)

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

KITT PEAK

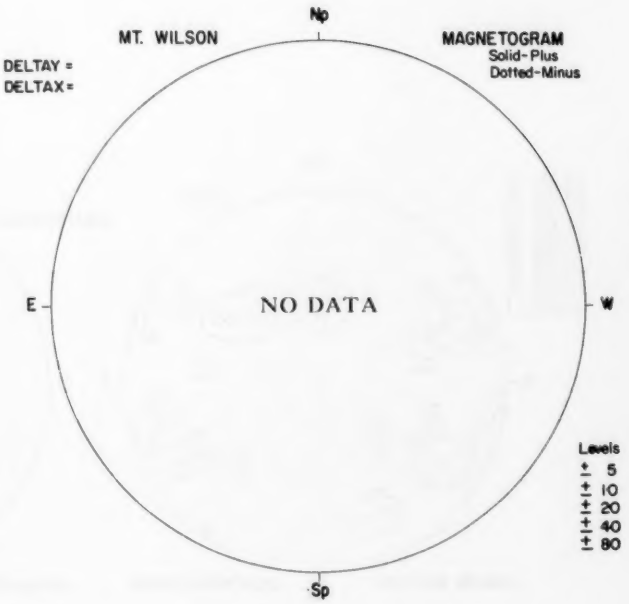
MAGNETOGRAM
Bright - Plus
Dark - Minus



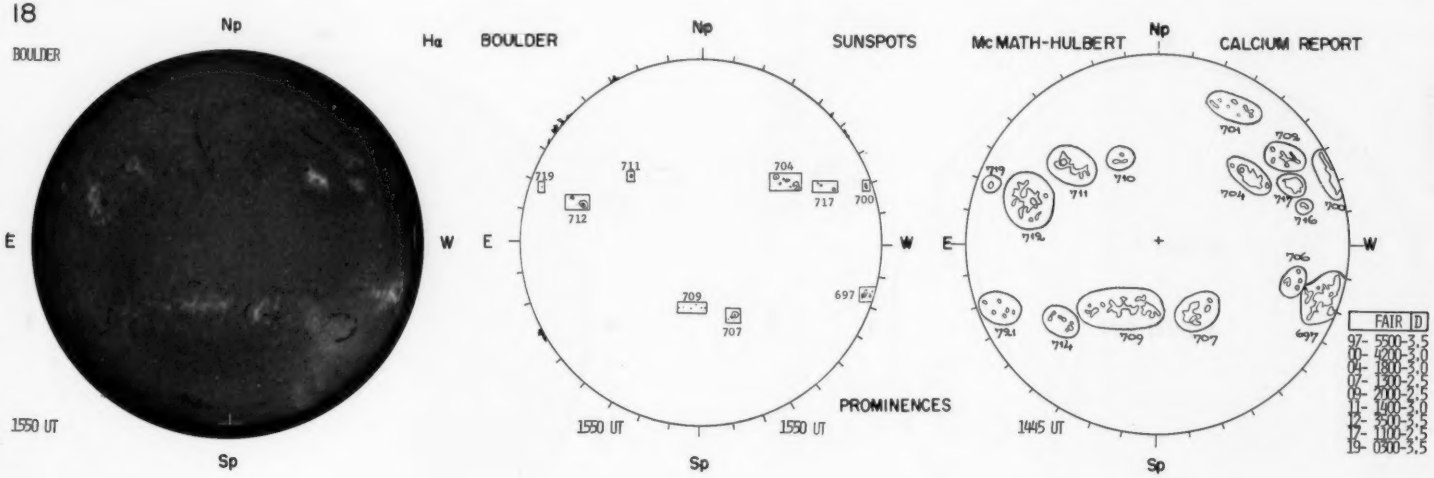
MT. WILSON

DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



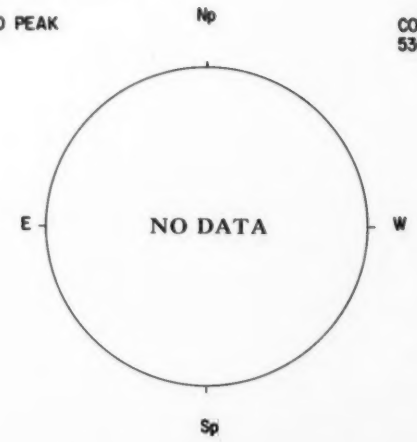
18


BOULDER
Np
Sp
E
W
1550 UT
Hα BOULDER
SUNSPOTS
719
711
704
712
717
700
709
707
697
PROMINENCES
1550 UT
1550 UT
McMATH-HULBERT
CALCIUM REPORT
1445 UT
701
708
719
711
710
704
712
706
721
714
709
707
697
FAIR D
97- 5500-3.5
00- 4200-3.0
04- 1800-3.0
07- 1300-2.5
09- 2000-2.5
11- 1400-3.0
12- 3500-3.5
17- 1100-2.5
19- 0300-3.5

DECEMBER 19, 1978 (P = 8.53, B_o = -1.41, L_o = 253.99)

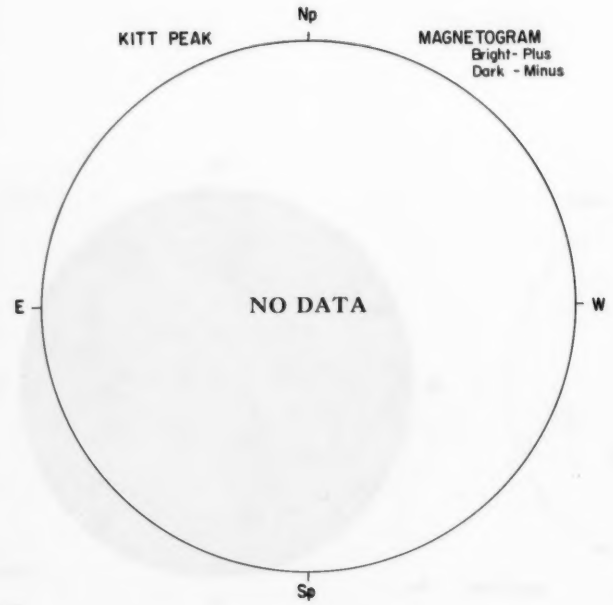
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

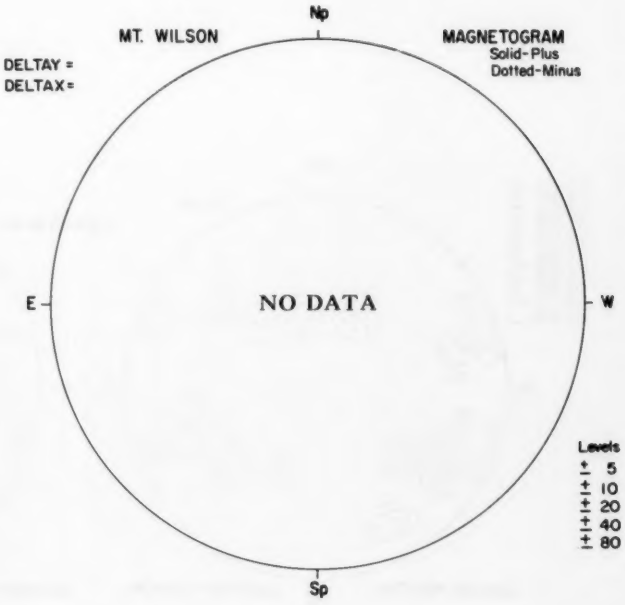
MAGNETOGRAM
Bright - Plus
Dark - Minus



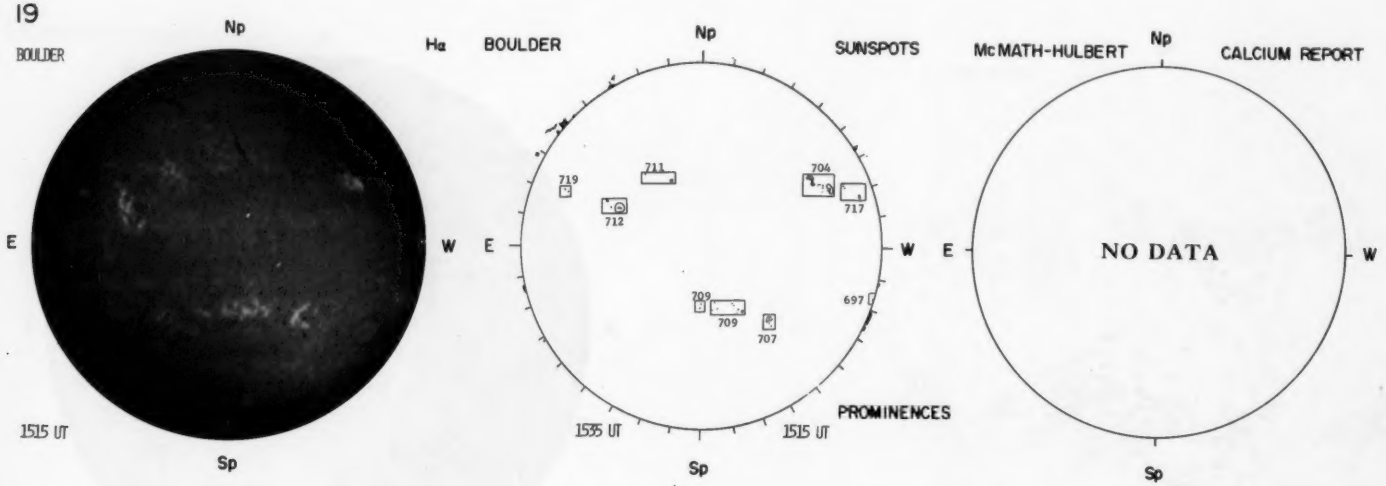
MT. WILSON

DELTAY =
DELTAX =

MAGNETOGRAM
Solid - Plus
Dotted - Minus



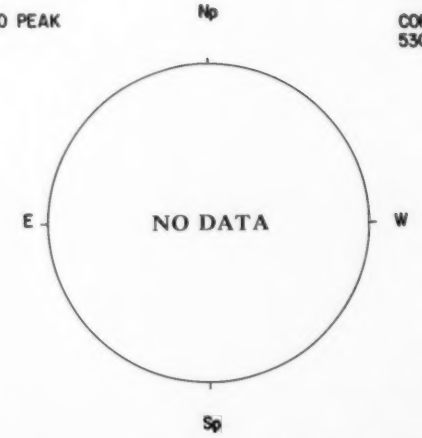
19

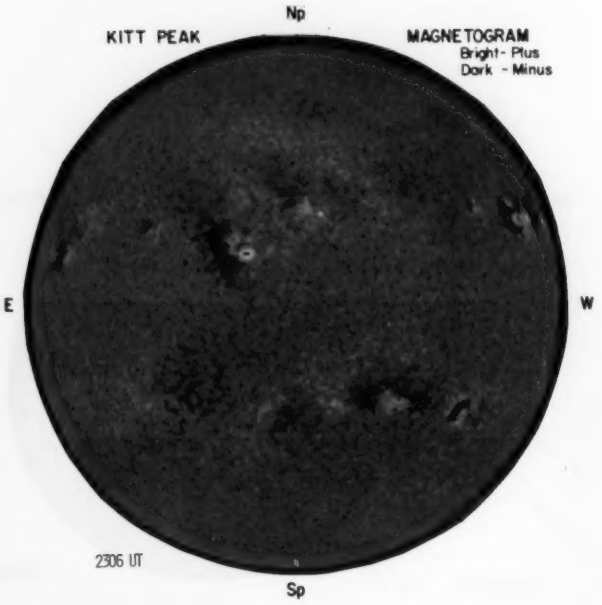

BOULDER
Np
E
W
Sp
1515 UT
Hα
BOULDER
Np
E
W
Sp
1535 UT
1515 UT
SUNSPOTS
719
711
704
712
717
709
709
697
707
PROMINENCES
McMATH-HULBERT
Np
CALCIUM REPORT
E
NO DATA
W
Sp

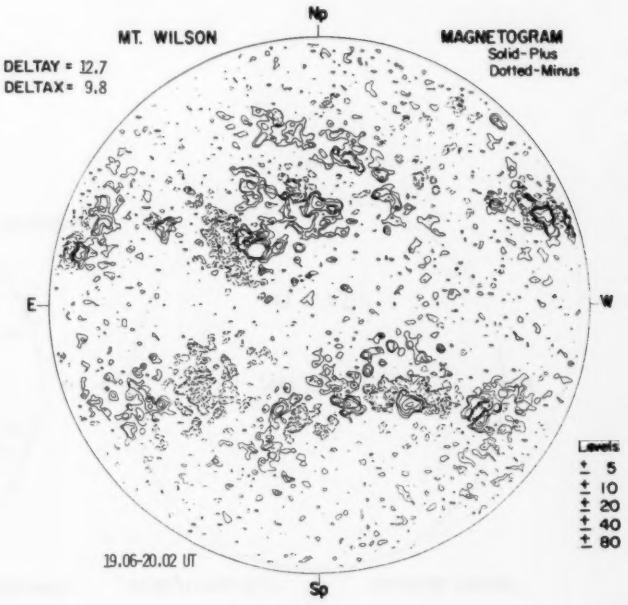
DECEMBER 20, 1978 (P = 8.07, B_o = -1.54, L_o = 240.82)

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

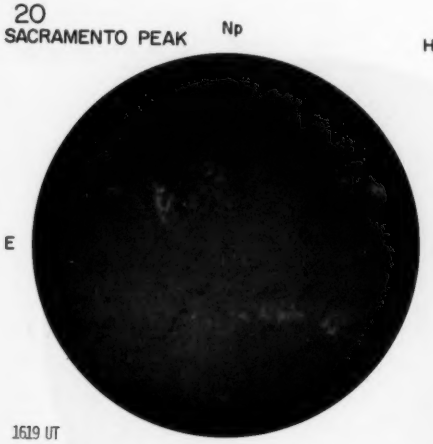




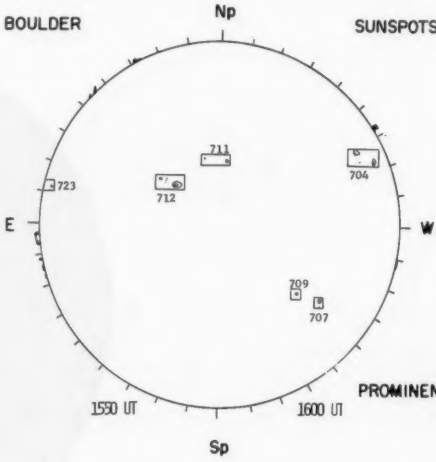


20

SACRAMENTO PEAK



Hα BOULDER

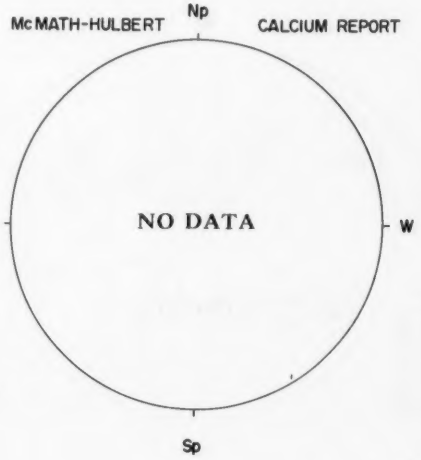


SUNSPOTS

PROMINENCES

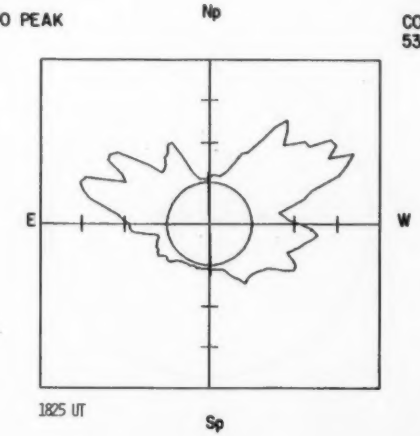
McMATH-HULBERT

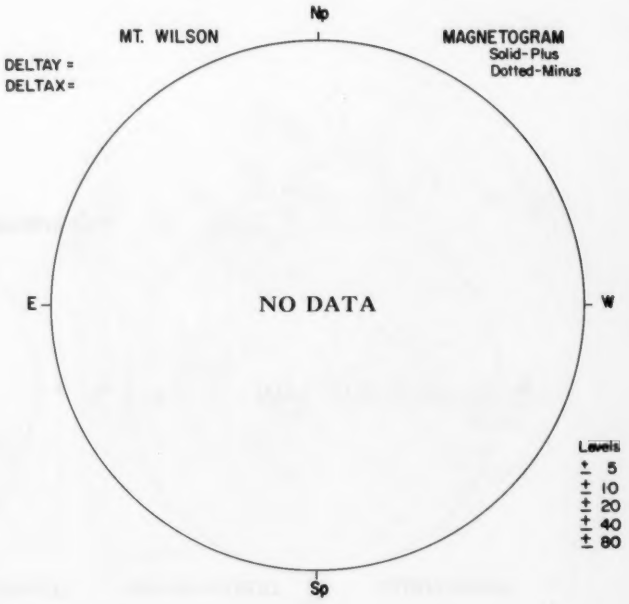
CALCIUM REPORT



DECEMBER 21, 1978 (P = 7.60, B_o = -1.66, L_n = 227.65)

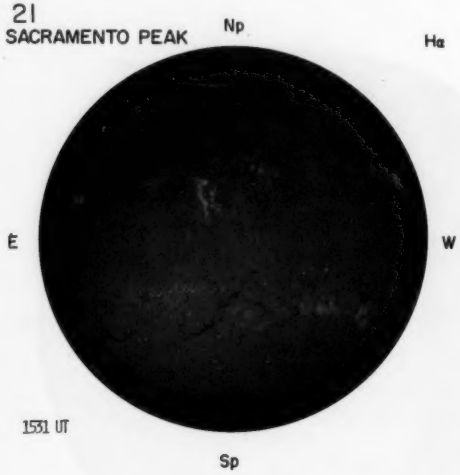
SACRAMENTO PEAK





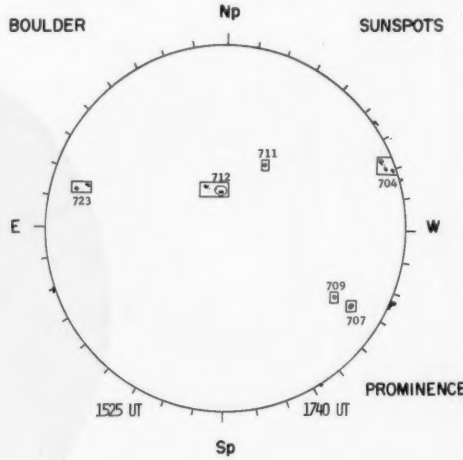
21

SACRAMENTO PEAK



1531 UT

Hα BOULDER

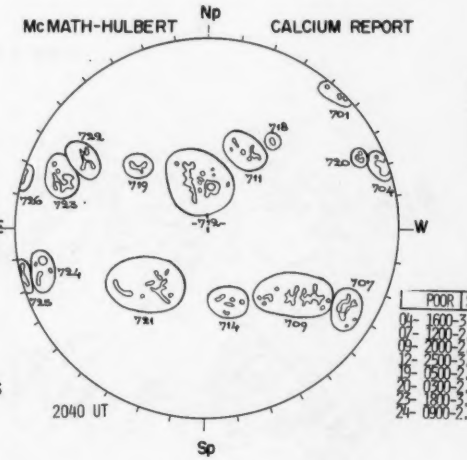


1525 UT 1740 UT

SUNSPOTS

PROMINENCES

McMATH-HULBERT



2040 UT

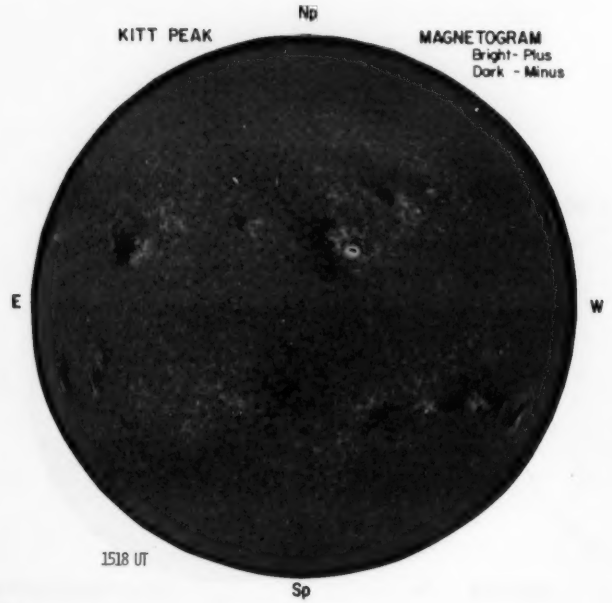
CALCIUM REPORT

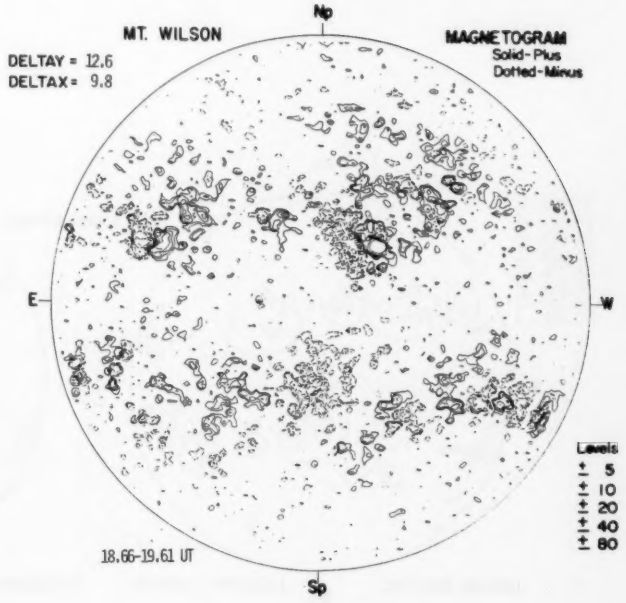
	POOR	S
04-	1600	3.5
07-	1200	2.5
09-	2000	2.5
12-	2500	3.0
16-	0500	2.5
20-	0900	2.5
22-	1800	2.5
24-	0900	2.5

DECEMBER 22, 1978 (P = 7.13, B_o = -1.79, L_o = 214.47)

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å

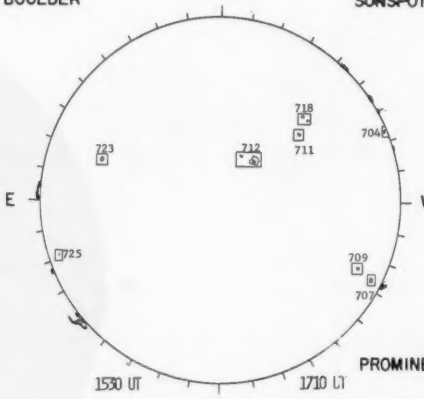




22

SACRAMENTO PEAK Np

Hα BOULDER Np

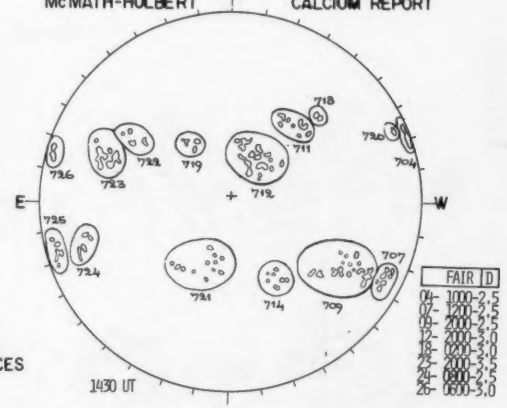


SUNSPOTS

PROMINENCES

McMATH-HULBERT Np

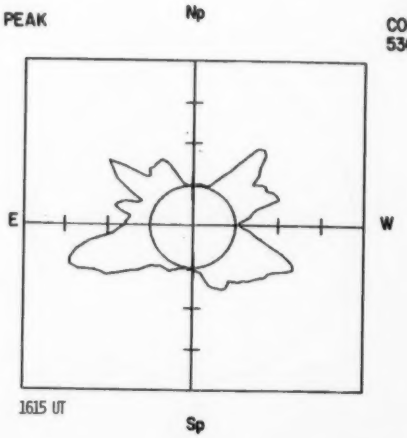
CALCIUM REPORT

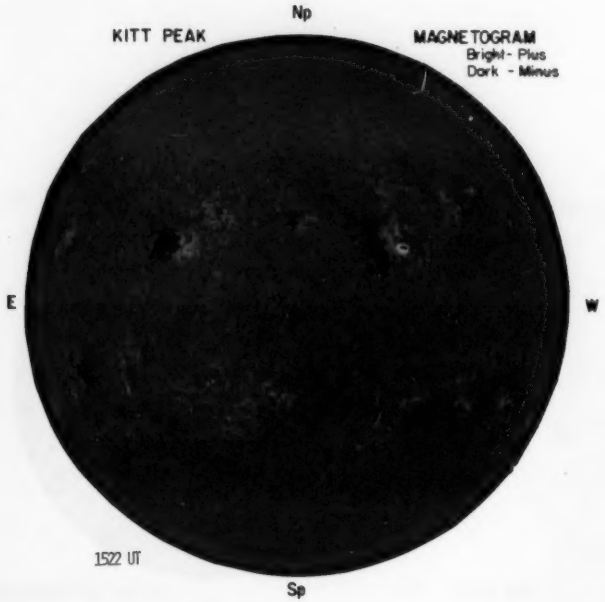


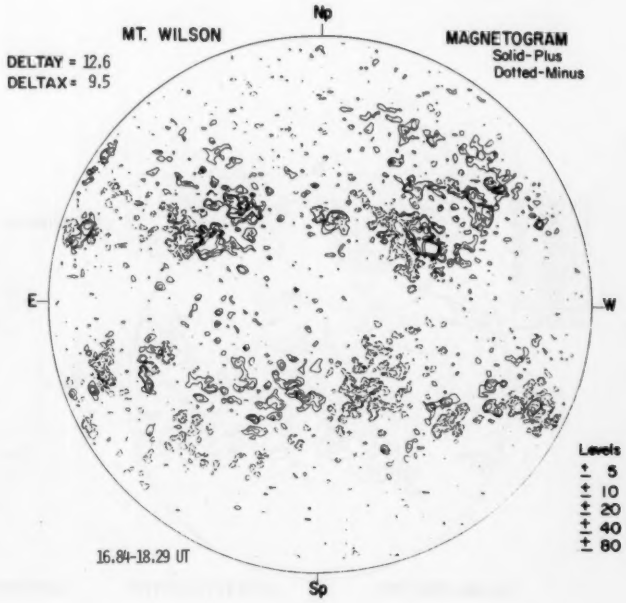
FAIR	D
04- 1000	2.5
07- 1200	2.5
09- 2000	2.5
12- 2000	3.0
16- 0000	3.0
23- 2000	3.0
24- 0800	2.5
26- 0600	3.0

DECEMBER 23, 1978 (P = 6.65, B_o = -1.91, L_o = 201.30)

SACRAMENTO PEAK

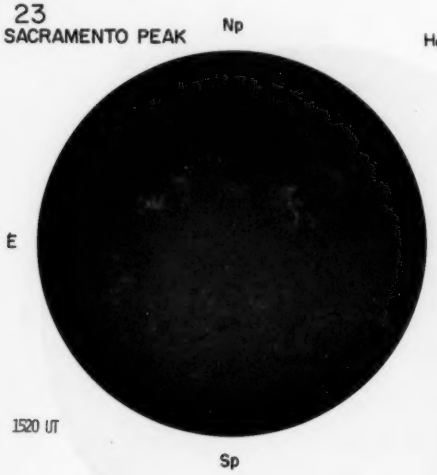




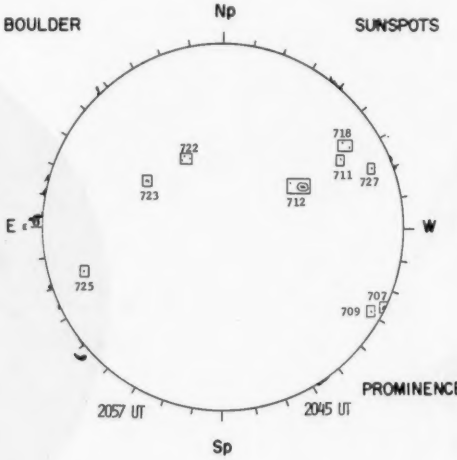


23

SACRAMENTO PEAK



Hα BOULDER

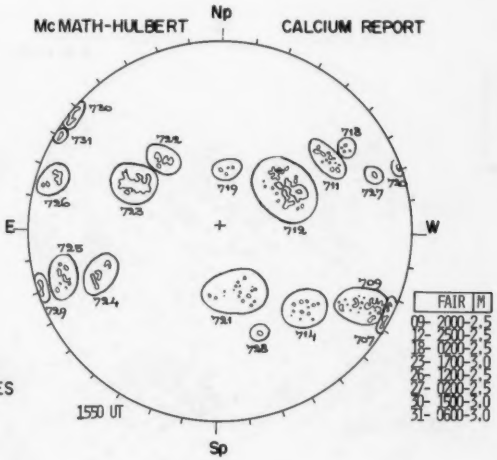


SUNSPOTS

PROMINENCES

McMATH-HULBERT

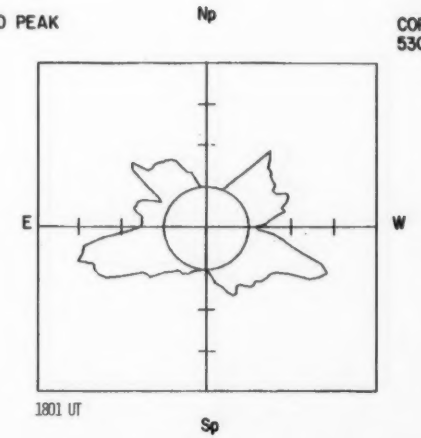
CALCIUM REPORT

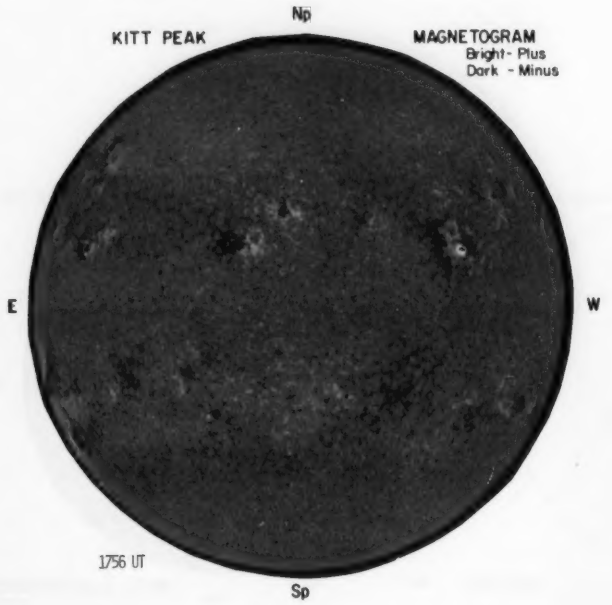


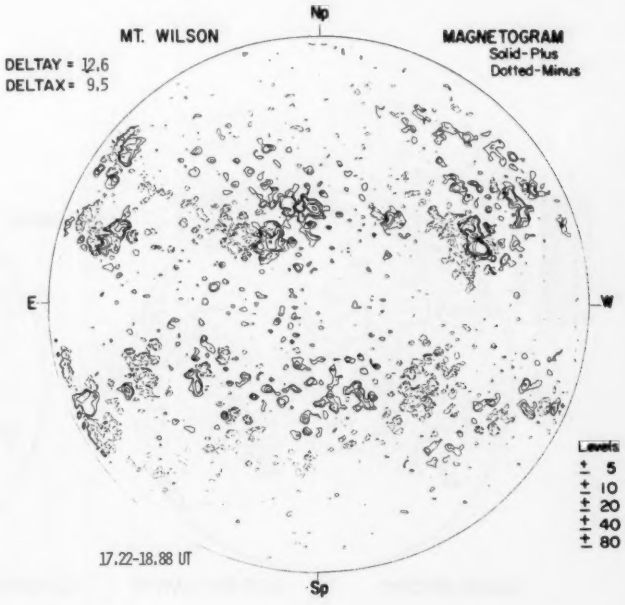
FAIR	M
09- 2000	2.5
17- 2500	5.5
18- 0200	5.5
23- 1200	3.0
26- 1200	2.5
27- 0200	2.5
30- 1500	3.0
31- 0600	3.0

DECEMBER 24, 1978 (P = 6.18, B_o = -2.04, L_o = 188.13)

SACRAMENTO PEAK



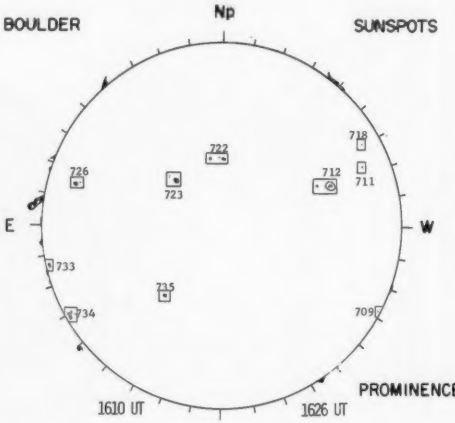




24

SACRAMENTO PEAK Np

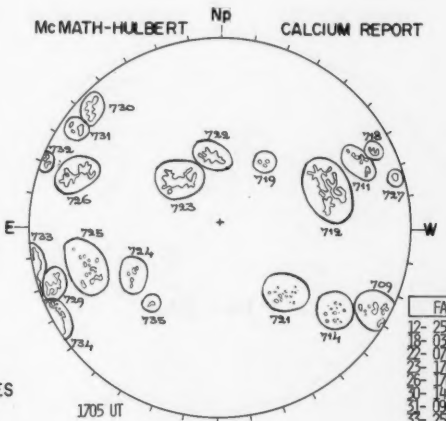
Hα BOULDER Np



SUNSPOTS

PROMINENCES

McMATH-HULBERT Np

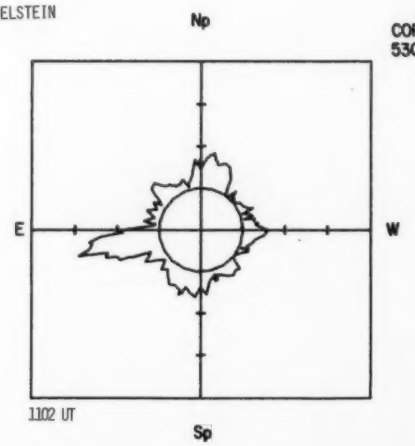


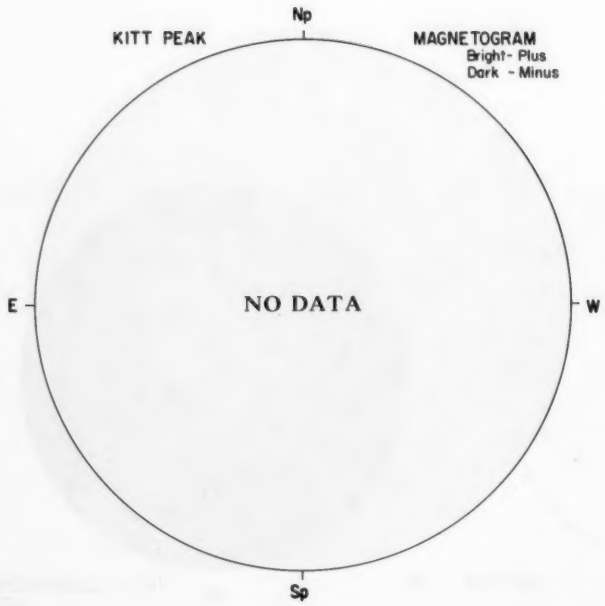
CALCIUM REPORT

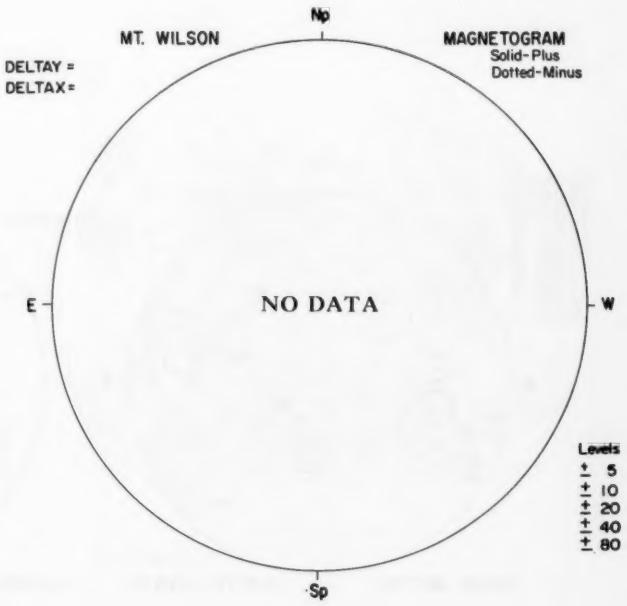
FAIR	M
12- 2500-2.5	
18- 0300-2.5	
22- 0700-2.5	
23- 1200-2.5	
25- 1700-3.0	
30- 1400-3.0	
31- 0900-2.5	
33- 2500-3.5	
34- 2400-3.5	

DECEMBER 25, 1978 (P = 5.70, B_o = -2.16, L_o = 174.95)

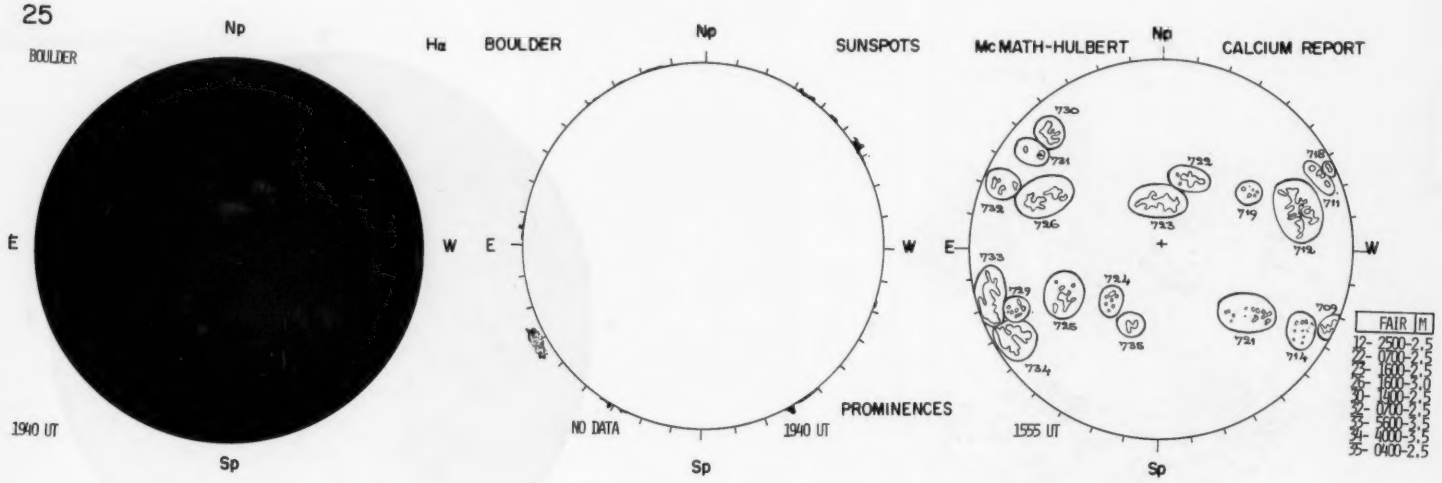
WENDELSTEIN





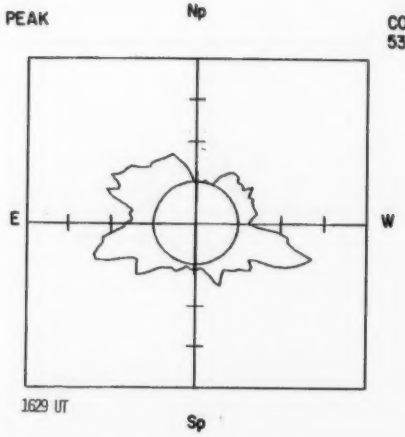


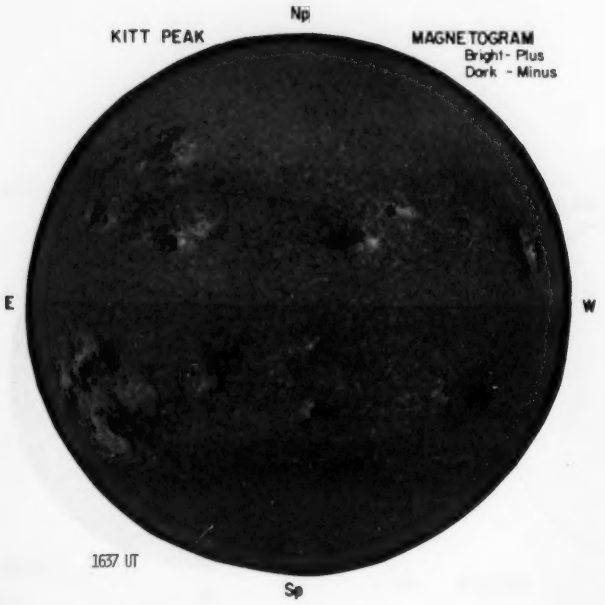
25

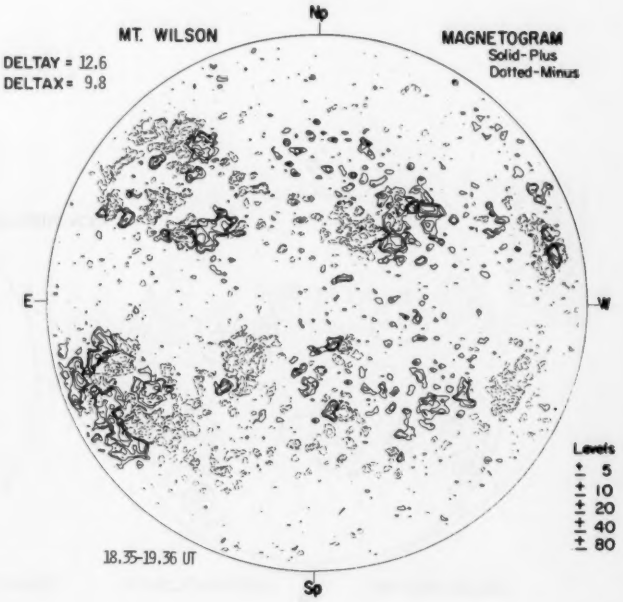

BOULDER
Np
E
W
Sp
1940 UT
Hα BOULDER
Np
E
W
Sp
NO DATA
1940 UT
SUNSPOTS
PROMINENCES
McMATH-HULBERT
Np
E
W
Sp
1555 UT
CALCIUM REPORT
730
731
732
726
733
739
734
725
724
735
723
722
719
718
711
712
721
709
714
FAIR M
12- 2500-2.5
22- 0700-2.5
24- 1600-2.5
25- 1600-3.0
30- 1400-2.5
32- 0700-2.5
33- 2600-3.5
34- 4000-3.5
35- 0400-2.5

DECEMBER 26, 1978 (P = 5.22, B_o = -2.28, L_o = 161.78)

SACRAMENTO PEAK



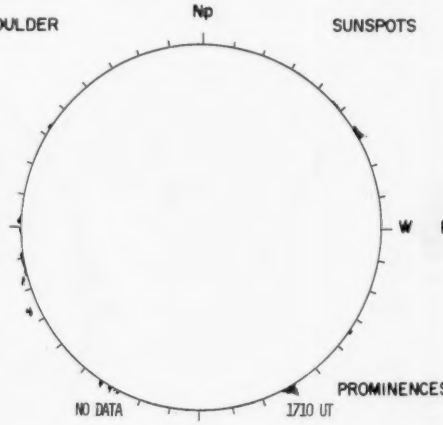




26

SACRAMENTO PEAK

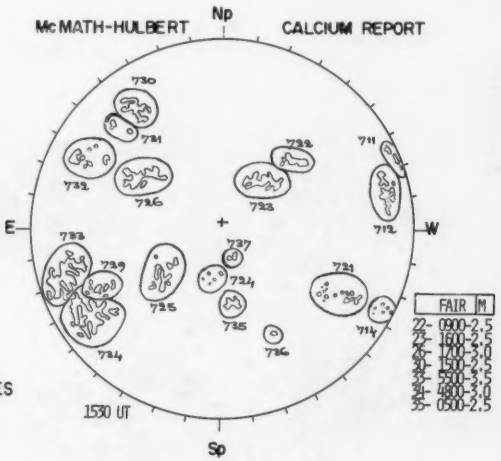
Hα BOULDER



SUNSPOTS

PROMINENCES

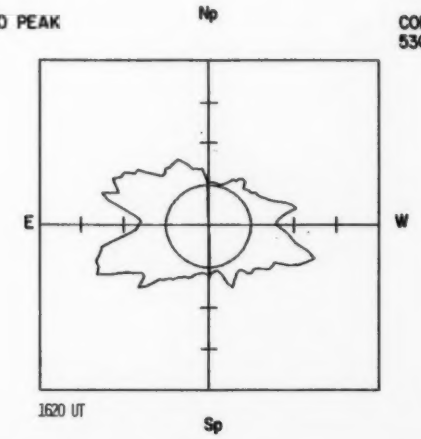
McMATH-HULBERT CALCIUM REPORT

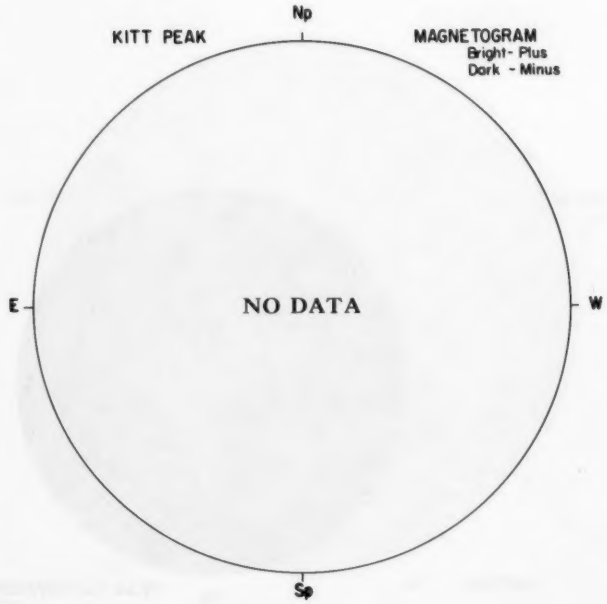


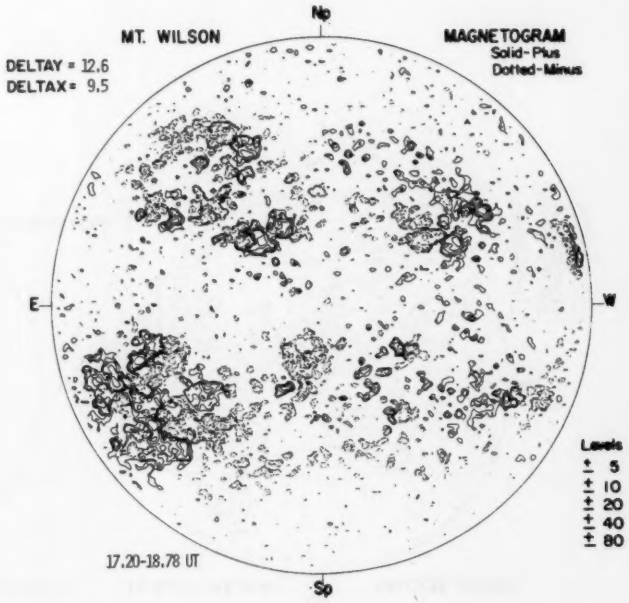
	FAIR	M
22-	0900	2.5
23-	1600	2.5
25-	1700	3.0
26-	1500	2.5
27-	1500	2.5
33-	2300	3.5
34-	1900	3.0
35-	0500	2.5

DECEMBER 27, 1978 (P = 4.74, B_o = -2.40, L_o = 148.61)

SACRAMENTO PEAK



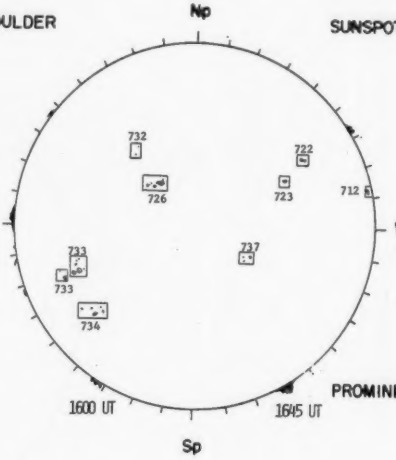




27

SACRAMENTO PEAK

Hα BOULDER

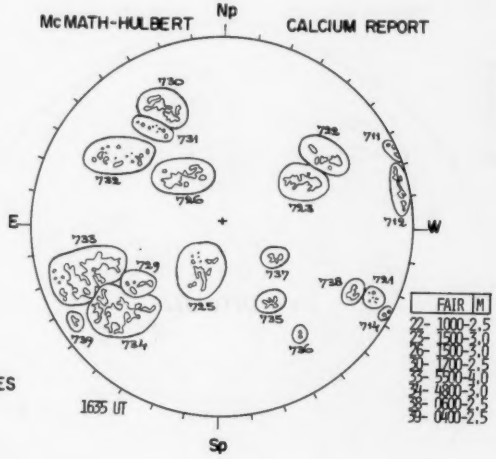


SUNSPOTS

PROMINENCES

McMATH-HULBERT

CALCIUM REPORT

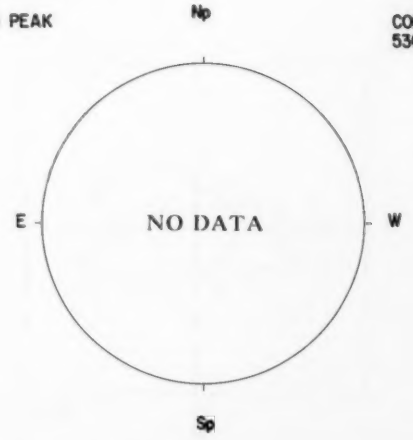


FAIR	M
22-	1000-2.5
23-	1500-3.0
24-	1500-3.0
26-	1500-3.0
30-	1200-2.5
32-	5500-4.0
34-	4800-3.0
38-	0600-2.5
39-	0400-2.5

DECEMBER 28, 1978 (P = 4.25, B_o = -2.52, L_o = 135.44)

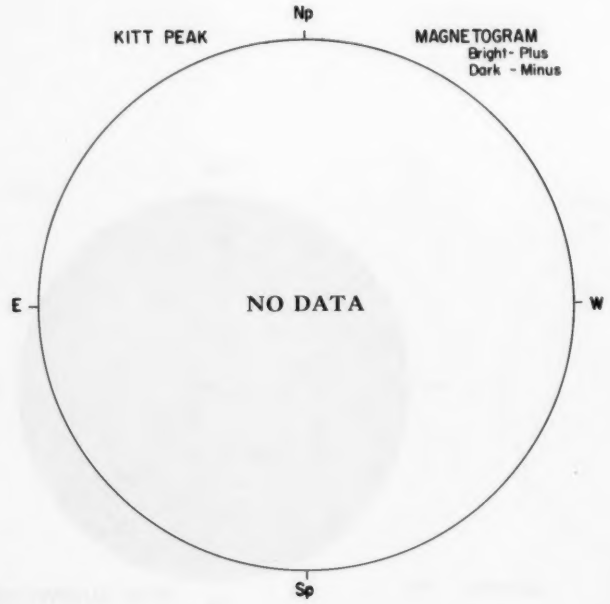
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

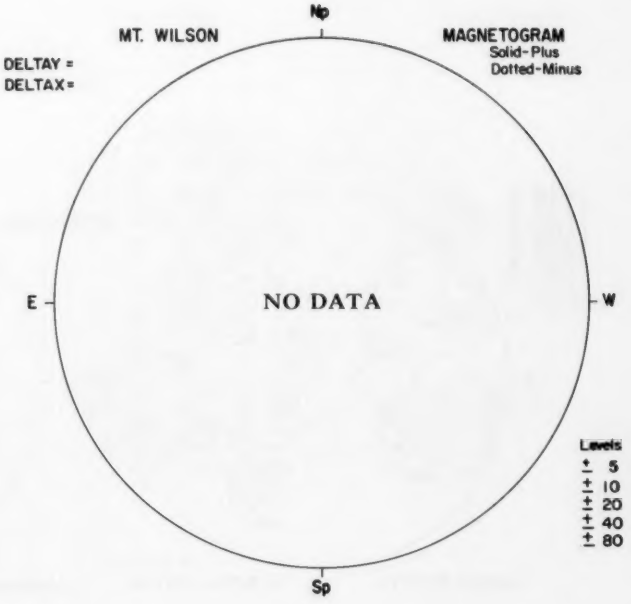
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

DELTAY =
DELTAX =

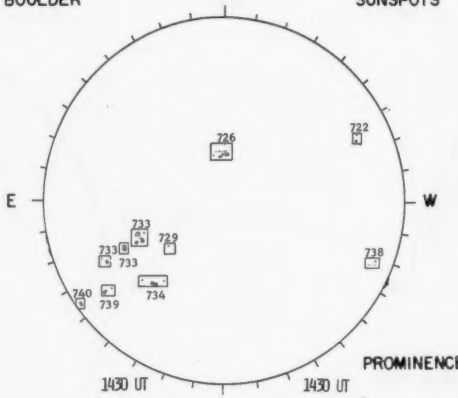
MAGNETOGRAM
Solid - Plus
Dotted - Minus



28

SACRAMENTO PEAK Np

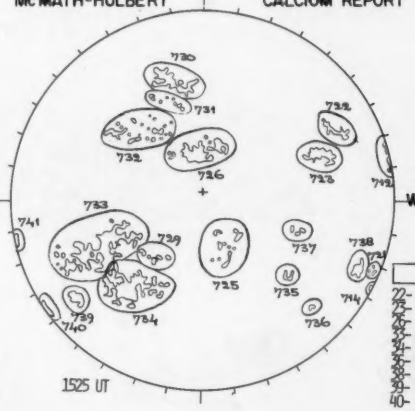
Hα BOULDER Np



SUNSPOTS

PROMINENCES

McMATH-HULBERT Np



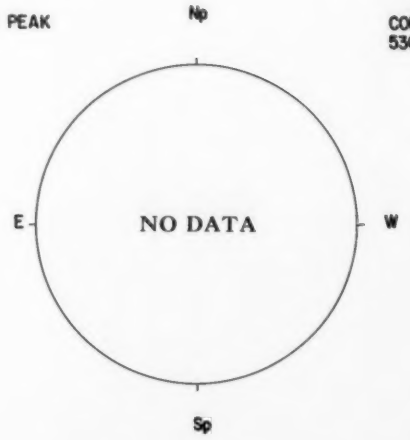
CALCIUM REPORT

FAIR	M
22- 0800-2.5	
23- 1500-3.5	
26- 1900-3.0	
33- 0200-3.5	
34- 0800-3.0	
36- 0200-2.5	
38- 1000-2.5	
39- 1000-3.5	
40- 1200-3.0	

DECEMBER 29, 1978 (P = 3.77, B_o = -2.64, L_o = 122.27)

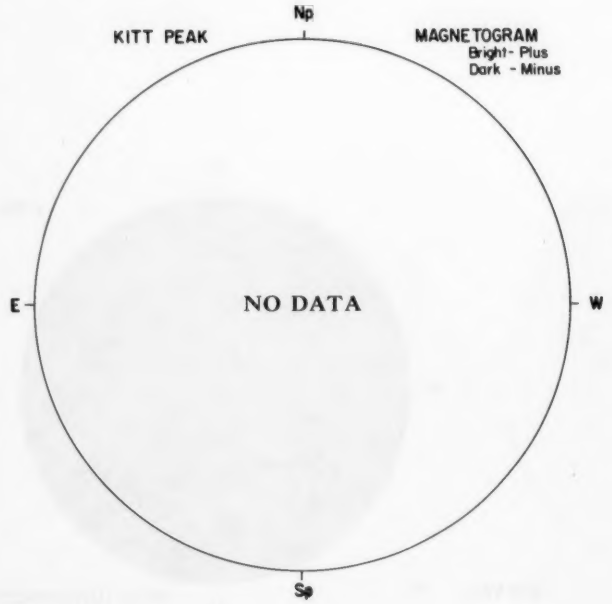
SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å



KITT PEAK

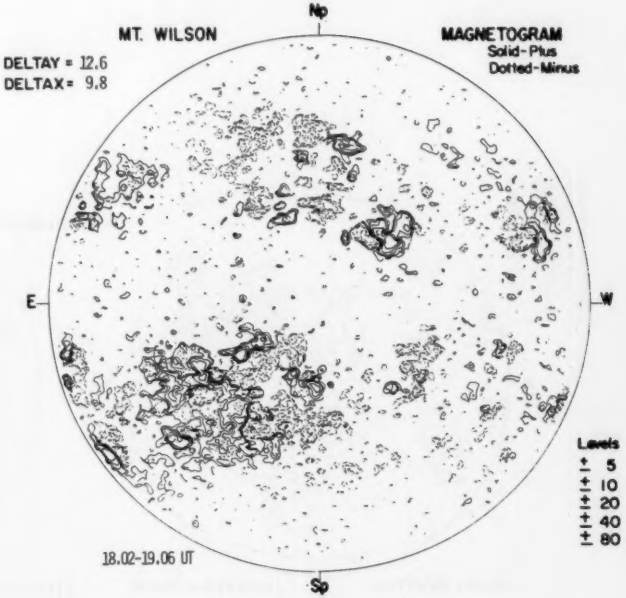
MAGNETOGRAM
Bright - Plus
Dark - Minus



MT. WILSON

DELTAY = 12.6
DELTAX = 9.8

MAGNETOGRAM
Solid - Plus
Dotted - Minus

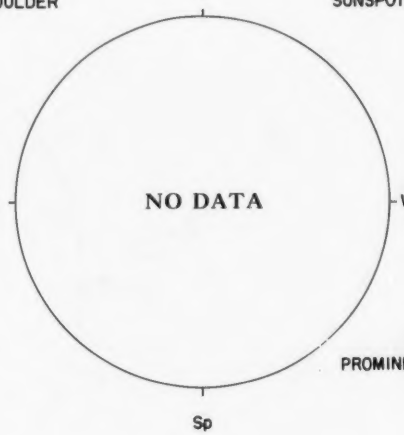


18.02-19.06 UT

29

SACRAMENTO PEAK

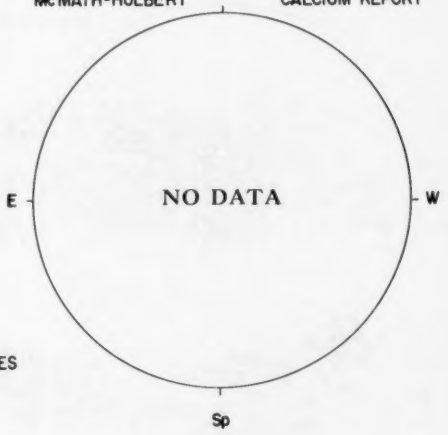
Hα BOULDER



SUNSPOTS

PROMINENCES

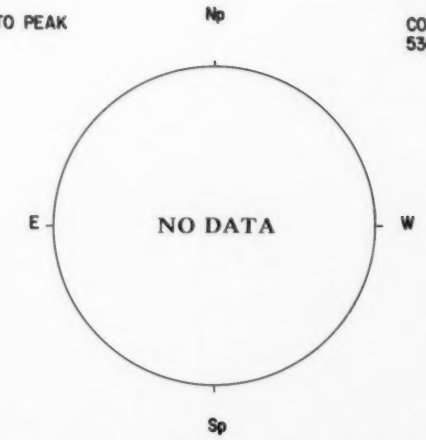
McMATH-HULBERT

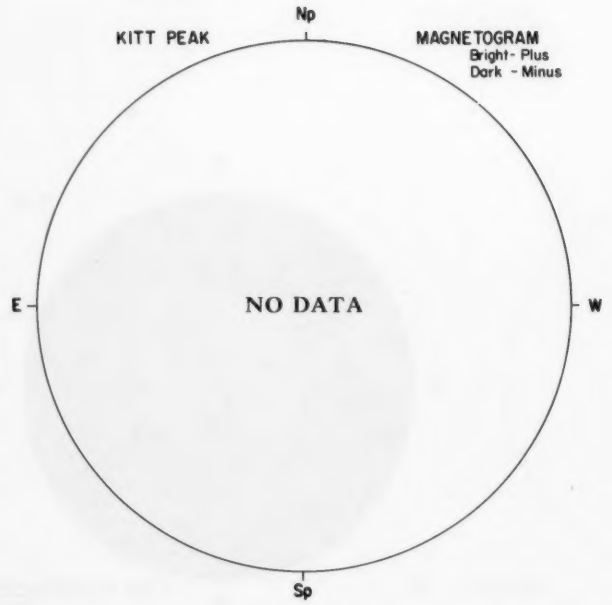


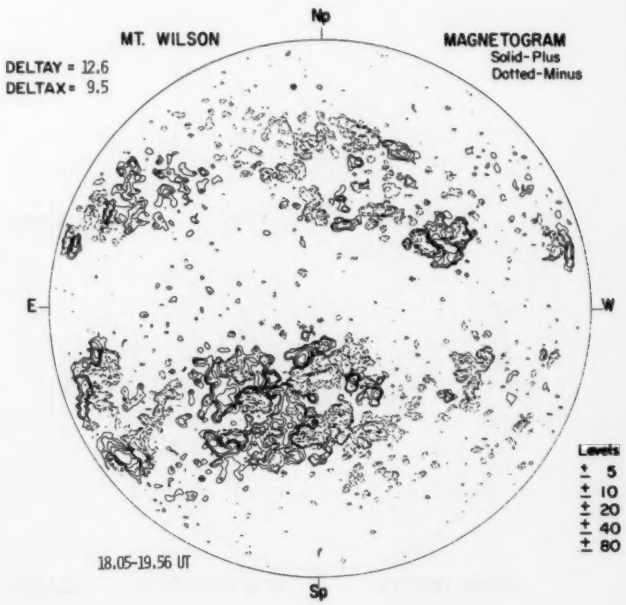
CALCIUM REPORT

DECEMBER 30, 1978 (P = 3.28, B_0 = -2.76, L_0 = 109.10)

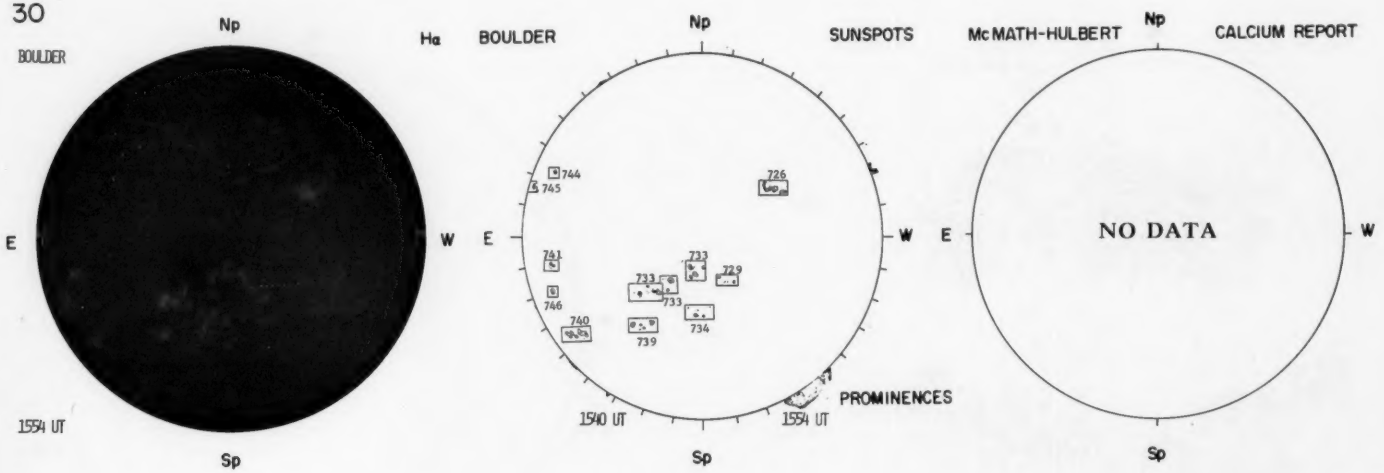
SACRAMENTO PEAK







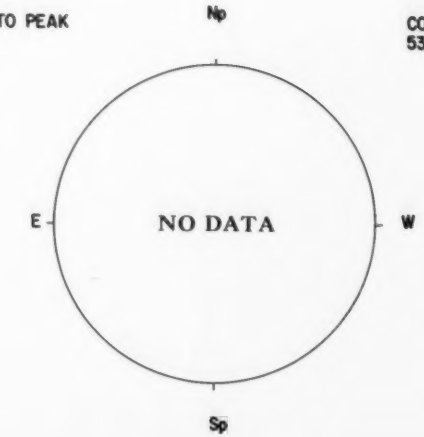
30

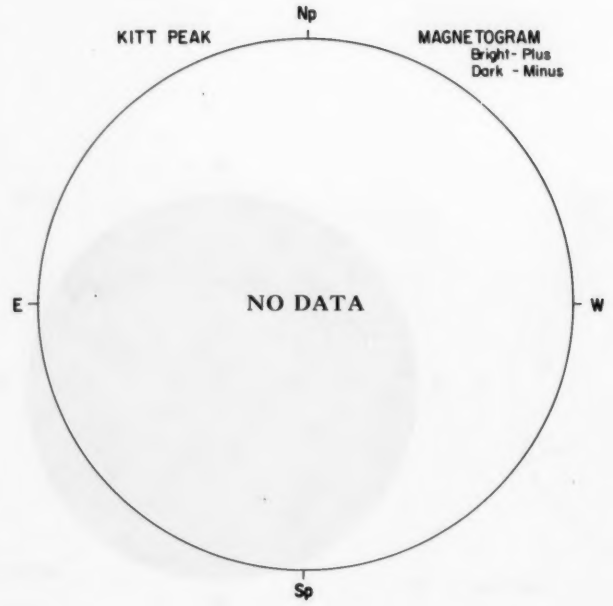

Np
BOULDER
Hα
E
W
1554 UT
Sp
BOULDER
SUNSPOTS
744
745
726
741
733
729
733
733
746
740
734
739
1540 UT
PROMINENCES
1554 UT
McMATH-HULBERT
CALCIUM REPORT
NO DATA

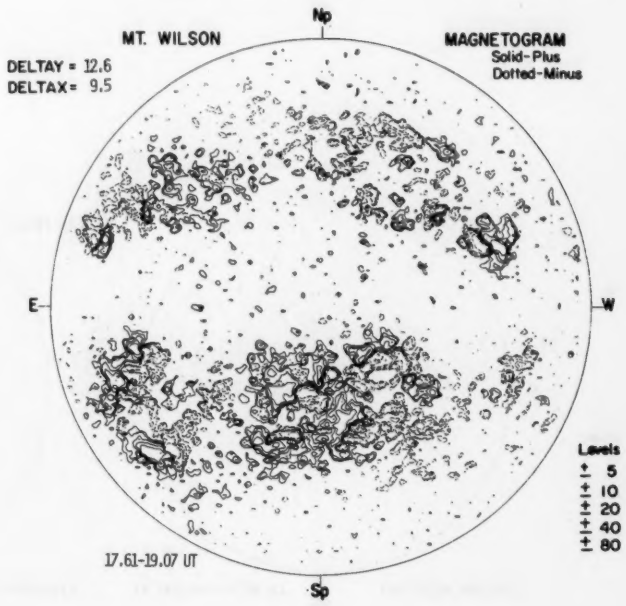
DECEMBER 31, 1978 (P = 2.80, B_o = -2.88, L_o = 95.93)

SACRAMENTO PEAK

CORONA (1.15 $R_\odot$)
5303 Å







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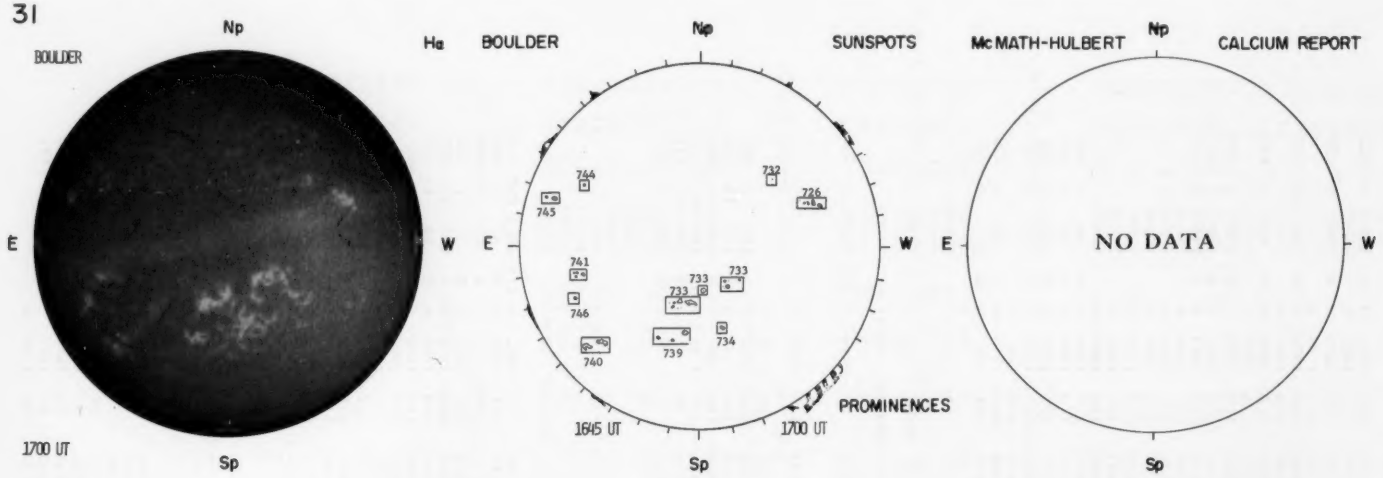
BOULDER
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1645 UT
1700 UT
PROMINENCES
McMATH-HULBERT
CALCIUM REPORT
NO DATA

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MCMATH REGION 15682 CMP DATE 2.0

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	11	25	15682	N17 E80	123	2000	2.5									
78	11	26	15682					20326	N13 E65	124	(AP)	3	M	180	4	DSO
78	11		15682					20329	N13 E78	111	(AF)	2				
78	11		15682					20335	N17 E74	115	(AP)	2	M	220	4	ESO
78	11	27	15682					20326	N14 E51	124	(A)	4				
78	11		15682					20329	N13 E56	119	(BF)	3	B	140	10	DAI
78	11	28	15682	N17 E42	119	1800	3.0	20326	N13 E38	124	(AP)	4				
78	11		15682					20329	N13 E43	119	(BF)	4	M	60	1	HSX
78	11	29	15682	N17 E28	121	2400	3.5	20326	N13 E25	124	(AP)	4				
78	11		15682					20329	N13 E31	118	(BF)	5	B	140	4	DSO
78	11	30	15682	N16 E18	119	3000	3.5	20326	N13 E08	128	(AP)	5	R	100	1	HSX
78	11		15682					20329	N13 E18	118	(AP)	5	R	110	6	CSO
78	12	1	15682					20326	N13 W06	128	(AP)	5				
78	12		15682					20329	N12 E06	116	(AP)	5				
78	12	2	15682					20326	N13 W18	126	(AP)	5				
78	12		15682					20329	N12 W07	115	(AP)	4				
78	12	3	15682					20326	N13 W33	128	(AP)	5				
78	12		15682					20329	N12 W21	116	(AP)	5				
78	12	4	15682	N15 W35	117	2500	3.0	20326	N13 W45	127	(AP)	4	B	60	1	HSX
78	12		15682					20329	N12 W33	115	(AP)	4	B	40	1	HSX
78	12	5	15682	N15 W49	118	2500	3.0	20326	N14 W59	128	(AP)	4	R	100	1	HSX
78	12		15682					20329	N13 W46	115	(AP)	5	R	120	3	CSO
78	12	6	15682	N15 W63	117	2000	2.5	20326	N14 W72	128	AP	4				
78	12		15682					20329	N13 W59	115	(AP)	4	M	120	1	HSX
78	12	7	15682					20329	N13 W74	116	AP	3	B	110	1	HSX

MCMATH REGION 15684 CMP DATE 2.6 RETURN OF REGION 15645; PART OF REGION 15635 ROTATIONS 2 AND 3

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	11	25	15684	S22 E85	118	900	1.5									
78	11	28	15684	S25 E52	109	2300	2.5									
78	11	29	15684	S25 E39	110	2800	2.5	20333	S28 E33	116	(AP)	3				
78	11	30	15684	S25 E27	110	2800	2.5									
78	12	3	15684					20338	S31 W09	104	(B)	3				
78	12	4	15684	S27 W27	109	3300	3.0	20338	S31 W22	104	(B)	3	B	100	3	DSO
78	12	5	15684	S28 W40	109	3800	3.0	20338	S31 W35	104	(B)	3	R	150	30	EAI
78	12	6	15684	S28 W53	107	3800	3.0	20338	S30 W48	104	BP	3	M	160	14	DAO
78	12	7	15684					20338	S29 W61	103	(B)	3	B	260	21	EAI
78	12	8	15684					20338	S29 W70	99	B	4	B	250	12	EAI
78	12	9	15684	S28 W85	100	1800	2.0		S28 W86				R	250	5	DKC
78	12	10	15684	S30 W89	92	400	1.0									

MCMATH REGION 15686 CMP DATE 2.9

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	11	26	15686					20327	N22 E79	110	(AP)	2	M	80	1	HSX
78	11	27	15686					20327	N23 E66	109	(AP)	3	B	60	1	HSX
78	11		15686					20328	N28 E68	107	(AP)	2	B	20	2	CSO
78	11	28	15686	N26 E54	107	1300	3.0	20327	N24 E53	109	(AP)	4	M	130	10	DSO
78	11	29	15686	N27 E42	107	1000	3.0	20327	N22 E40	109	(AP)	4	B	60	1	HSX
78	11	30	15686	N26 E30	107	1000	2.5	20327	N23 E27	109	(AP)	4	R	60	1	HSX
78	12	1	15686					20327	N23 E15	107	(AP)	5				
78	12	2	15686					20327	N22 E02	106	(AP)	4				
78	12	3	15686					20327	N22 W12	107	(AP)	4				
78	12	4	15686	N26 W23	105	1000	2.5	20327	N22 W24	106	(AP)	4	B	50	1	HSX
78	12	5	15686	N25 W36	105	1000	2.0	20327	N22 W37	106	(AP)	4	R	50	1	HSX
78	12	6	15686	N25 W50	104	1300	2.5	20327	N22 W48	104	(AP)	4	M	90	1	HSX
78	12	7	15686					20327	N23 W63	105	(AP)	3	B	80	1	HSX
78	12	8	15686						N23 W77				B	60	1	HSX

MCMATH REGION 15687 CMP DATE 4.4 RETURN OF REGION 15641 ROTATION 2

				CALCIUM	PLAGE	DATA		SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	11	28	15687	S16 E72	89	3300	3.0	20332	S17 E67	95	(BP)	4	M	30	1	AXX
78	11		15687						S18 E80				M	10	1	HSX
78	11	29	15687	S16 E63	86	5000	3.5	20332	S19 E54	95	(BP)	4	B	240	10	CHO
78	11		15687					20334	S19 E64	85	(B)	3	B	140	4	EAI
78	11	30	15687	S17 E51	86	5400	3.5	20332	S17 E43	93	(AP)	4	R	210	12	DKO
78	11		15687					20334	S18 E49	87	(AP)	3	R	200	24	ERI
78	12	1	15687					20332	S18 E30	92	(B)	4				

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MCMATH REGION 15687 (CONT) CMP DATE 4.4 RETURN OF REGION 15641 ROTATION 2

				CALCIUM	PLAGE DATA			SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12		15687					20334	S18 E42	80	(B)	4				
78	12	2	15687					20332	S18 E18	90	(BP)	4				
78	12		15687					20334	S18 E29	79	(B)	3				
78	12	3	15687					20332	S18 E05	90	(BY)	4				
78	12		15687					20334	S19 E17	78	(BP)	4				
78	12	4	15687	S17 W03	85	6200	3.5	20332	S18 W08	90	(BY)	4	B	230	8	DKI
78	12		15687					20334	S19 E04	78	(BP)	4	B	70	4	DSI
78	12	5	15687	S18 W15	84	6200	3.5	20332	S18 W24	93	(BY)	5	R	450	39	EKI
78	12		15687					20334	S21 W13	82	(BP)	4	R	110	25	CSO
78	12	6	15687	S19 W29	83	6500	3.5	20332	S17 W35	91	(BP)	4				
78	12		15687					20334	S20 W27	83	BP	4	H	310	15	DKI
78	12	7	15687					20332	S17 W50	92	(BP)	4	B	220	11	EKO
78	12		15687					20334	S20 W39	81	(AP)	4	B	80	2	CSO
78	12	8	15687					20332	S17 W65	94	(AP)	4	B	310	8	CKO
78	12		15687					20334	S20 W51	80	(AP)	3	B	90	2	CSO
78	12	9	15687	S19 W67	82	3700	2.5	20332	S13 W76	92	(AP)	3	R	140	2	HKX
78	12		15687					20334	S21 W63	79	(AP)	3	R	100	3	CSO
78	12	10	15687	S19 W78	81	2000	2.0	20334	S20 W77	80	(AP)	3	B	20	1	HSX

MCMATH REGION 15688 CMP DATE 5.9

				CALCIUM	PLAGE DATA			SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	11	29	15688	N30 E83	66	200	1.0									
78	11	30	15688	N30 E70	67	200	1.0									
78	12	4	15688	N29 E16	66	300	1.5									
78	12	5	15688	N29 E03	66	200	1.5									
78	12	6	15688	N29 W11	65	200	1.5									
78	12	9	15688	N29 W50	65	300	1.0									
78	12	10	15688	N29 W61	64	300	1.0									

MCMATH REGION 15689 CMP DATE 6.6 RETURN OF REGION 15642 ROTATION 4

				CALCIUM	PLAGE DATA			SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	11	30	15689	S20 E82	55	1700	2.0									
78	12	4	15689	S21 E25	57	1700	2.5									
78	12	5	15689	S20 E12	57	1500	2.5	20341	S19 E17	52	(B)	3	R	30	6	CRO
78	12	6	15689	S20 W01	55	1200	2.0	20341	S19 E03	53	(B)	2	H	40	3	DRO
78	12	7	15689					20341	S18 W12	54	(B)	3	B	70	17	DSI
78	12	8	15689					20341	S19 W24	53	B	4	B	90	9	DAO
78	12	9	15689	S20 W39	54	1200	3.0	20341	S18 W36	52	(B)	2	R	60	12	DRO
78	12	10	15689	S20 W51	54	1000	2.5									
78	12	11	15689	S20 W64	54	1300	2.5									
78	12	12	15689	S20 W76	53	1300	2.5									

MCMATH REGION 15691 CMP DATE 7.4 RETURN OF REGION 15643 ROTATION 4

				CALCIUM	PLAGE DATA			SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	11	30	15691	N14 E88	49	500	1.5									
78	12	1	15691					20337	N16 E71	51	(AP)	5				
78	12	2	15691					20337	N16 E59	49	(AP)	4				
78	12	3	15691					20337	N17 E45	50	(AP)	4				
78	12	4	15691	N20 E35	47	2000	2.5	20337	N16 E33	49	(AP)	4	B	70	1	HSX
78	12		15691					20340	N25 E35	47	(AP)	2				
78	12	5	15691	N20 E22	47	2000	2.5	20337	N16 E20	49	(AP)	4	R	90	3	CSO
78	12		15691					20340	N25 E22	47	(AP)	2	R	20	4	BXO
78	12	6	15691	N20 E08	46	2000	2.5	20337	N16 E07	49	(AP)	4	H	60	1	HSX
78	12	7	15691					20337	N16 W06	48	(AP)	4	B	80	1	HSX
78	12	8	15691					20337	N16 W18	47	(AP)	4	B	70	1	HSX
78	12	9	15691	N20 W30	45	1400	2.5	20337	N16 W30	46	(AP)	4	R	120	1	HSX
78	12	10	15691	N20 W41	44	1400	2.5	20337	N17 W45	48	(AP)	4	B	130	1	HSX
78	12	11	15691	N20 W53	43	1400	2.0	20337	N16 W60	41	(AP)	4	B	60	1	HSX
78	12	12	15691	N20 W65	42	1400	1.5	20337	N16 W70	47	(AP)	3	B	90	1	HSX
78	12	13	15691	N22 W78	41	800	1.0	20337	N16 W80	44	AP	3				

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MCMATH REGION 15708 CMP DATE 8.2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	12	15708	N09 W59	36	100	1.0									

MCMATH REGION 15694 CMP DATE 8.4

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	3	15694					20339	S22 E62	33	(B)	3				
78	12	4	15694	S23 E52	30	1500	3.0	20339	S23 E50	32	(B)	2	B	140	5	ESO
78	12	5	15694	S23 E39	30	1200	3.0	20339	S24 E36	33	(B)	3	R	120	13	EAO
78	12	6	15694	S23 E24	30	1300	2.5	20339	S23 E20	36	(AP)	3	H	110	8	ESO
78	12	7	15694					20339	S23 E13	29	(BP)	4	B	140	19	DAI
78	12		15694					20343	S16 E04	38	(AF)	2	B	10	2	AXX
78	12	8	15694					20339	S22 W05	34	BP	4	B	290	18	DKI
78	12		15694					20343	S17 W07	36	(B)	2	B	30	2	CSO
78	12	9	15694	S23 W18	33	2200	3.0	20339	S22 W18	34	(BP)	5	R	220	34	ESI
78	12		15694					20343	S18 W19	35	(B)	4	R	50	14	DSO
78	12	10	15694	S23 W30	33	2200	3.0	20339	S22 W32	35	(BP)	4	B	300	8	DSI
78	12		15694					20343	S17 W33	36	(B)	5	B	460	10	DKI
78	12	11	15694	S21 W43	33	3500	3.5	20339	S24 W45	36	(BP)	4	B	210	7	DAI
78	12		15694					20343	S18 W46	37	(BD)	5	B	810	16	DKC
78	12	12	15694	S21 W56	33	3500	4.5	20339	S23 W58	35	BP	4	B	120	2	DSO
78	12		15694					20343	S17 W60	37	(BD)	4	B	1200	18	EKC
78	12	13	15694	S21 W70	33	3700	4.0	20339	S23 W71	35	(AP)	3	B	60	1	HSX
78	12		15694					20343	S18 W72	36	BY	4	B	1100	8	EKC
78	12	14	15694	S21 W85	37	3000	4.0									

MCMATH REGION 15698 CMP DATE 9.4

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	6	15698	S40 E35	19	100	1.5									

MCMATH REGION 15695 CMP DATE 9.6

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	4	15695	N15 E66	16	200	2.0									
78	12	5	15695	N15 E51	18	200	2.0									
78	12	6	15695	N15 E37	17	200	1.5									

MCMATH REGION 15696 CMP DATE 11.2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	4	15696	S22 E83	0	1500	2.0									
78	12	5	15696	S23 E74	356	2400	2.5									
78	12	6	15696	S22 E60	355	2800	3.0									
78	12	9	15696	S22 E19	357	2300	2.5	20346	S19 E11	5	(AP)	2	R	10	1	AXX
78	12	10	15696	S22 E08	356	2000	2.5	20348	S18 E17	347	(BP)	2	B	10	6	BXO
78	12	11	15696	S21 W02	352	2800	2.5	20348	S20 E03	348	(BY)	3	B	130	17	DAI
78	12	12	15696	S22 W14	351	3400	3.0	20348	S20 W11	348	BP	4	B	130	11	DAO
78	12	13	15696	S20 W27	350	3700	3.0	20348	S20 W24	348	(BP)	4	B	320	11	EKI
78	12	14	15696	S20 W40	352	3200	3.0	20348	S19 W38	349	(BD)	4	B	180	10	EKI
78	12	15	15696	S21 W53	352	3700	3.0	20348	S19 W51	349	B	3	B	230	2	DSO
78	12	16	15696	S22 W65	349	3400	2.5	20348	S19 W69	354	(AP)	3	B	140	3	CSO
78	12	17	15696	S22 W78	350	2500	2.0		S20 W71				H	130	3	CSO

MCMATH REGION 15699 CMP DATE 11.2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	6	15699	N25 E58	357	300	1.5									
78	12	9	15699	N25 E20	356	200	1.0									
78	12	10	15699	N25 E08	356	300	1.0									
78	12	11	15699	N25 W07	357	200	1.0									
78	12	12	15699	N25 W20	357	100	1.0									
78	12	13	15699	N25 W34	357	100	1.5									

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MCMATH REGION 15699 (CONT) CMP DATE 11.2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	14	15699	N25 W46	358	100	1.5									
78	12	15	15699	N25 W60	359	100	1.0									

MCMATH REGION 15715 CMP DATE 12.2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	16	15715	N09 W60	344	200	1.5									
78	12	17	15715	N09 W74	346	200	1.0									

MCMATH REGION 15700 CMP DATE 12.5 RETURN OF REGION 15651 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	6	15700	N23 E78	337	500	3.0									
78	12	7	15700					20344	N22 E65	338	(B)	4	B	160	5	DHO
78	12	8	15700					20344	N21 E51	339	(B)	4	B	590	10	DHO
78	12	9	15700	N23 E37	339	2400	3.5	20344	N25 E38	309	(B)	5	R	40	7	CAO
78	12	10	15700	N23 E24	340	2600	3.5	20344	N22 E25	339	(BY)	5	B	1110	36	EKC
78	12	11	15700	N23 E11	339	3300	3.0	20344	N20 E11	340	(B)	5	B	1170	36	FKI
78	12	12	15700	N23 W02	339	3800	3.5	20344	N21 W01	338	B	5	B	1060	25	FKI
78	12	13	15700	N22 W15	338	4200	3.0	20344	N21 W15	339	(BY)	5	B	780	28	FKI
78	12		15700					20352	N13 W18	342	(AP)	3	B	0	1	AXX
78	12	14	15700	N22 W28	340	4800	3.0	20344	N21 W29	340	(B)	5	B	370	20	EKI
78	12	15	15700	N22 W41	340	5000	3.5	20344	N21 W42	340	B	5	B	500	9	FHI
78	12	16	15700	N22 W54	338	4600	3.0	20344	N22 W56	341	(BP)	5	B	530	12	FKI
78	12	17	15700	N22 W68	340	4600	3.0		N21 W63				H	480	6	FAO
78	12	18	15700	N22 W80	338	4200	3.0									

MCMATH REGION 15697 CMP DATE 13.3 RETURN OF REGION 15654 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	6	15697	S16 E80	335	3200	3.5	20342	S17 E79	338	B	3				
78	12	7	15697					20342	S16 E69	334	BP	3	B	560	15	EHI
78	12	8	15697					20342	S16 E56	334	(B)	4	B	710	19	EHI
78	12		15697					20345	S12 E60	330	(B)	3	B	30	1	HSX
78	12	9	15697	S16 E47	329	5000	3.5	20342	S17 E45	332	(BY)	5	R	700	24	EKC
78	12		15697					20345	S12 E50	327	(AP)	4	R	70	9	CAO
78	12	10	15697	S16 E35	329	4600	3.5	20342	S16 E30	334	(BY)	5	B	990	20	FKI
78	12		15697					20345	S12 E35	329	(AP)	3	B	70	8	CAO
78	12	11	15697	S16 E21	329	4600	3.5	20342	S17 E17	334	(BY)	5	B	790	22	EKI
78	12		15697					20345	S12 E21	330	(BP)	3	B	60	10	CSI
78	12		15697					20349	S18 E28	323	(B)	3	B	70	4	DSO
78	12	12	15697	S16 E09	328	5000	3.0	20342	S17 E04	333	(BY)	5	B	820	14	EKI
78	12		15697					20345	S12 E07	330	AP	3	B	20	13	CRI
78	12		15697					20345	S18 E14	323	B	3	B	30	9	CRO
78	12	13	15697	S16 W04	327	5800	3.0	20342	S17 W09	333	(BD)	5	B	980	20	DKI
78	12		15697					20345	S12 W08	332	(AP)	3	B	40	4	AXX
78	12		15697					20349	S18 E01	323	(B)	3	B	60	13	DRI
78	12		15697					20353	S17 E11	313	(B)	4				
78	12	14	15697	S16 W17	329	6300	3.0	20342	S17 W22	333	(B)	5	B	980	15	EKI
78	12		15697					20345	S12 W22	333	(AP)	2	B	20	4	AXX
78	12		15697					20349	S18 W15	326	(BY)	4	B	110	14	DRI
78	12		15697					20353	S17 W05	316	(BP)	3	B	120	4	DSO
78	12	15	15697	S16 W30	329	6300	3.0	20342	S17 W35	333	B	5	B	1000	5	EKC
78	12		15697					20345	S12 W34	332	AP	2	B	20	5	OSI
78	12		15697					20349	S18 W26	324	B	3	B	20	5	DKI
78	12		15697					20353	S18 W19	317	BP	3	B	100	2	HSO
78	12	16	15697	S16 W42	326	5800	3.0	20342	S17 W49	334	(B)	5	B	1050	31	EKC
78	12		15697					20345	S12 W48	333	(AP)	3				
78	12		15697					20349	S17 W39	324	(B)	3	B	130	10	DAI
78	12		15697					20353	S17 W32	317	(BP)	3	B	10	5	BXO
78	12	17	15697	S16 W55	327	5600	3.0		S18 W44				H	140	14	DAI
78	12		15697						S16 W54				H	1060	27	EKI
78	12	18	15697	S16 W68	326	5500	3.5		S16 W77				B	400	4	FHI
78	12	19	15697						S17 W90				B	10	1	AXX

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MCMATH REGION 15702 CMP DATE 14.7

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	9	15702	N27 E68	308	700	3.5	20347	N25 E68	309	(AP)	2				
78	12	10	15702	N27 E55	309	1000	3.0	20347	N25 E51	313	(AP)	3	B	20	3	AXX
78	12	11	15702	N27 E41	309	1100	2.5	20347	N25 E38	313	(AP)	3	B	60	2	CSO
78	12	12	15702	N27 E28	309	800	2.0	20347	N24 E27	310	B	3	B	10	3	BXO
78	12	13	15702	N27 E14	309	800	2.0	20347	N24 E14	310	(B)	3	B	20	5	BXO
78	12	14	15702	N27 E01	311	1100	2.5	20347	N24 W01	312	(AP)	2				
78	12	15	15702	N27 W12	311	800	2.0									
78	12	16	15702	N27 W24	308	700	2.5									
78	12	17	15702	N27 W34	306	800	2.5									
78	12	18	15702	N27 W49	307	800	2.0									

MCMATH REGION 15716 CMP DATE 14.9

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	16	15716	N11 W24	308	200	2.0									
78	12	17	15716	N11 W38	310	200	1.5									
78	12	18	15716	N11 W51	309	200	1.0									

MCMATH REGION 15705 CMP DATE 15.1

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	10	15705	N18 E62	302	100	1.0									
78	12	11	15705	N18 E45	305	100	1.0									

MCMATH REGION 15706 CMP DATE 15.1

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	10	15706	S11 E63	301	100	1.0									
78	12	11	15706	S11 E48	302	300	3.0	20350	S12 E48	303	(B)	3				
78	12	12	15706	S11 E36	301	200	1.5	20350	S12 E34	303	B	3	B	20	2	CRO
78	12	13	15706	S11 E21	302	100	1.5	20350	S12 E18	306	(AP)	3	B	20	3	CRO
78	12	14	15706	S12 E07	305	300	2.0	20350	S12 E05	306	(AP)	1	B	20	4	HRX
78	12	15	15706	S13 W06	305	200	2.0									
78	12	16	15706	S13 W20	304	200	1.0									
78	12	17	15706	S14 W35	307	300	1.5		S16 W37				H	30	3	CSO
78	12	18	15706	S13 W46	304	300	1.0									

MCMATH REGION 15717 CMP DATE 15.2

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	16	15717	N16 W20	304	300	2.0	20357	N18 W20	305	(AP)	2				
78	12	17	15717	N16 W34	306	500	3.0		N17 W39				H	80	10	DAO
78	12	18	15717	N17 W48	306	1100	2.5		N17 W48				B	120	4	DRO

MCMATH REGION 15701 CMP DATE 15.5

				CALCIUM PLAGE DATA				SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	9	15701	N42 E70	306	900	2.0		N42 E68				R	20	2	AXX
78	12	10	15701	N42 E58	306	1500	2.0									
78	12	11	15701	N42 E45	305	1000	1.5									
78	12	12	15701	N42 E35	302	900	2.0									
78	12	13	15701	N42 E23	300	900	2.0									
78	12	14	15701	N43 E12	300	1200	2.5									
78	12	15	15701	N43 E01	298	800	2.0									
78	12	16	15701	N43 W11	295	1000	1.5									
78	12	17	15701	N43 W24	296	1000	2.0									
78	12	18	15701	N44 W36	294	800	1.5									
78	12	21	15701	N45 W80	296	300	1.0									

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MCMATH REGION 15704 CMP DATE 16.3 RETURN OF PART OF REGION 15662 AND NEW ROTATIONS 1 AND 3

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	10	15704	N16 E75	289	500	1.0									
78	12	11	15704	N16 E61	289	300	1.5									
78	12	12	15704	N16 E48	289	300	1.0									
78	12	13	15704	N16 E34	289	200	1.0									
78	12	14	15704	N15 E21	291	400	1.0									
78	12	15	15704	N17 E09	290	200	1.5									
78	12	16	15704	N18 W04	288	400	2.5	20358	N19 W04	289	(BY)	3	B	60	5	DSO
78	12	17	15704	N18 W17	289	1200	3.0		N19 W11				H	80	12	DSO
78	12	18	15704	N20 W30	288	1800	3.0		N30 W19				B	400	14	DAI
78	12	19	15704						N19 W45				B	430	14	EAI
78	12	20	15704					20358	N20 W60	291	(B)	5	B	360	5	EAO
78	12	21	15704	N20 W76	292	1600	3.5	20358	N19 W71	289	(B)	3	B	390	6	EAI
78	12	22	15704	N20 W86	292	1000	2.5	20358	N20 W85	289	B	3	B	40	1	HSX

MCMATH REGION 15720 CMP DATE 17.4

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	21	15720	N22 W59	275	300	2.5									
78	12	22	15720	N22 W68	274	300	2.0									
78	12	23	15720	N22 W82	274	200	1.0									

MCMATH REGION 15707 CMP DATE 17.8

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	11	15707	S23 E77	273	1300	3.5	20351	S24 E77	274	AP	4	B	140	1	HSX
78	12	12	15707	S24 E65	272	1100	3.5	20351	S24 E64	273	AP	4	B	110	2	HSX
78	12	13	15707	S24 E52	271	1100	3.5	20351	S24 E51	273	(AP)	4	B	180	4	HSX
78	12	14	15707	S24 E41	271	1100	3.5	20351	S24 E38	273	(AP)	3	B	110	2	HSX
78	12	15	15707	S24 E28	271	1100	3.0	20351	S24 E26	272	AP	4	B	20	2	HAX
78	12	16	15707	S23 E14	270	1300	3.0	20351	S24 E12	273	(AP)	4	B	120	2	HAX
78	12	17	15707	S23 E02	270	1200	2.5		S23 W04				H	130	8	CSO
78	12	18	15707	S23 W11	269	1300	2.5		S23 W25				B	130	3	HSX
78	12	20	15707					20351	S26 W40	271	(BY)	3	B	100	2	HSX
78	12	21	15707	S24 W54	270	1200	2.5	20351	S25 W52	270	(BY)	3	B	130	1	HSX
78	12	22	15707	S24 W64	270	1200	2.5	20351	S26 W66	270	(AP)	2	B	120	1	HSX
78	12	23	15707	S24 W77	269	1200	2.0	20351	S26 W79	271	(AP)	2	B	40	1	HSX
78	12		15707					20362	S28 W67	259	(AP)	1	B	10	1	AXX

MCMATH REGION 15727 CMP DATE 19.3

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	23	15727	N18 W58	250	200	2.5	20363	N17 W57	249	(B)	1	B	0	1	AXX
78	12	24	15727	N18 W72	250	300	1.5	20363	N17 W71	250	(AP)	1				

MCMATH REGION 15709 CMP DATE 19.4 RETURN OF MOSTLY REGIONS 15668 AND 15669 ROTATIONS 3 AND 2

			CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	13	15709	S21 E80	243	600	2.0									
78	12	14	15709	S22 E71	241	1000	2.5									
78	12	15	15709	S21 E54	245	1000	3.5	20355	S22 E43	255	B	2	B	20	2	CSO
78	12	16	15709	S21 E39	245	1500	3.0	20355	S22 E30	255	(BF)	3	B	110	7	DAO
78	12	17	15709	S21 E25	247	1700	3.0		S21 E13				H	100	9	DSO
78	12	18	15709	S21 E11	247	2000	2.5		S03 E21				B	60	6	BXI
78	12	19	15709						S20 W09				B	40	10	CRO
78	12	20	15709					20355	S23 W30	261	(AP)	2	B	40	1	HSX
78	12	21	15709	S21 W31	247	2000	2.5	20355	S23 W43	261	(AP)	2	B	40	1	HSX
78	12	22	15709	S21 W40	246	2000	2.5	20355	S23 W56	260	(AP)	1	B	40	1	HSX
78	12	23	15709	S23 W55	247	2000	2.5									
78	12	24	15709	S24 W68	246	1600	2.0		S28 W79				B	10	1	AXX
78	12	25	15709	S24 W81	247	1400	1.0									

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MCMATH REGION 15710 CMP DATE 19.6

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	13	15710	N24 E78	245	400	1.0									
78	12	14	15710	N25 E68	244	500	1.5									
78	12	15	15710	N24 E52	247	400	1.5									
78	12	16	15710	N24 E39	245	200	1.5									
78	12	17	15710	N25 E26	246	300	1.0									
78	12	18	15710	N25 E13	245	200	1.0									

MCMATH REGION 15718 CMP DATE 20.0

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	21	15718	N25 W25	241	200	2.0									
78	12	22	15718	N25 W30	236	200	3.0	20360	N26 W33	237	(B)	2	B	60	2	DSO
78	12	23	15718	N25 W45	237	200	2.5	20360	N26 W45	237	(B)	2	B	10	2	BXO
78	12	24	15718	N25 W60	238	300	2.5		N26 W59				B	10	1	AXX
78	12	25	15718	N25 W73	239	300	1.5									

MCMATH REGION 15713 CMP DATE 20.3

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	15	15713	S08 E64	235	300	2.5									
78	12	16	15713	S08 E49	235	200	1.0									
78	12	17	15713	S08 E36	236	100	1.5									

MCMATH REGION 15711 CMP DATE 20.9

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	14	15711	N20 E83	229	300	1.0	20354	N19 E78	233	AP	3	B	40	1	HRX
78	12	15	15711	N23 E71	228	1500	2.0	20354	N21 E65	233	AP	3	B	20	1	HSX
78	12	16	15711	N23 E58	226	1000	2.5	20354	N21 E53	232	(BP)	4	B	70	1	HSX
78	12	17	15711	N22 E45	227	1300	2.5		N21 E45				M	60	1	HSX
78	12	18	15711	N22 E30	228	1400	3.0		N20 E24				B	10	1	AXX
78	12	20	15711					20354	N19 W03	234	(AP)	3	B	30	2	CSO
78	12	21	15711	N23 W13	229	1000	2.0	20354	N20 W15	233	(AP)	2	B	50	1	HSX
78	12	22	15711	N23 W22	228	1000	2.0	20354	N20 W28	232	(AP)	2	B	40	1	HSX
78	12	23	15711	N23 W36	228	1000	2.0	20354	N20 W41	233	(AP)	1				
78	12	24	15711	N22 W50	228	800	2.0		N18 W55				B	10	1	AXX
78	12	25	15711	N22 W63	229	800	2.0									
78	12	26	15711	N22 W76	229	700	1.0									
78	12	27	15711	N25 W88	226	400	1.0									

MCMATH REGION 15714 CMP DATE 21.3

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	15	15714	S23 E71	228	800	1.5									
78	12	16	15714	S23 E60	224	500	2.0									
78	12	17	15714	S23 E48	224	400	2.0									
78	12	18	15714	S24 E33	225	400	2.0									
78	12	21	15714	S24 W08	224	400	1.5									
78	12	22	15714	S24 W16	222	400	1.0									
78	12	23	15714	S24 W30	222	300	1.0									
78	12	24	15714	S25 W44	222	300	1.0									
78	12	25	15714	S25 W56	222	300	1.0									
78	12	26	15714	S25 W70	223	400	1.0									
78	12	27	15714	S26 W84	222	200	1.0									
78	12	28	15714	S26 W90	216	500	2.0									

MCMATH REGION 15712 CMP DATE 22.1 RETURN OF REGION 15673 ROTATION 4

				CALCIUM	PLAGE	DATA			SUNSPOT	DATA						
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	15	15712	N10 E85	214	2100	2.0	20356	N11 E80	218	AP	3	B	190	1	HSX
78	12	16	15712	N13 E72	212	3500	3.5	20356	N12 E70	215	(BP)	4	B	390	4	DHO
78	12	17	15712	N13 E60	212	3500	3.5		N12 E65				H	380	4	DHO

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MCMATH REGION 15712 (CONT) CMP DATE 22.1 RETURN OF REGION 15673 ROTATION 4

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	18	15712	N13 E46	212	3500	3.5
78	12	20	15712				
78	12	21	15712	N13 E03	213	2500	3.0
78	12	22	15712	N13 W07	213	2000	3.0
78	12	23	15712	N13 W20	212	2500	2.5
78	12	24	15712	N13 W34	212	2500	2.5
78	12	25	15712	N13 W47	213	2500	2.5
78	12	26	15712	N12 W60	213	2400	2.0
78	12	27	15712	N12 W74	212	1800	2.0
78	12	28	15712	N13 W87	213	800	1.0

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
	N11 E44				B	390	3	DHO
20356	N11 E14	217	(BP)	6	B	240	6	DKO
20356	N11 E03	215	(BP)	6	B	340	6	DKO
20356	N11 W11	215	(BP)	4	B	260	2	DHO
20356	N11 W23	215	(BP)	4	B	330	2	CHO
20356	N11 W35	214	(BP)	4	B	370	2	DHO
	N13 W55				H	90	1	HHX
20356	N12 W64	217	(AP)	5	H	140	1	HHX
20356	N11 W78	217	(AP)	3	B	130	1	HSX

MCMATH REGION 15728 CMP DATE 22.5

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	23	15728	S34 W15	207	100	1.5

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS

MCMATH REGION 15721 CMP DATE 23.4 RETURN OF REGION 15677 ROTATION 3

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	17	15721	S20 E78	194	600	1.0
78	12	18	15721	S20 E65	193	600	1.5
78	12	21	15721	S20 E20	196	800	1.5
78	12	22	15721	S20 E11	195	600	1.0
78	12	23	15721	S20 W05	197	500	1.0
78	12	24	15721	S21 W20	198	500	1.5
78	12	25	15721	S21 W31	197	500	1.5
78	12	26	15721	S21 W43	196	500	1.5
78	12	27	15721	S22 W58	196	300	1.5
78	12	28	15721	S22 W72	198	300	1.0

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS

MCMATH REGION 15719 CMP DATE 23.6

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	18	15719	N17 E69	189	300	3.5
78	12	19	15719				
78	12	21	15719	N18 E23	193	500	2.5
78	12	22	15719	N17 E13	193	400	2.0
78	12	23	15719	N17 W01	193	200	1.0
78	12	24	15719	N17 W13	191	200	1.0
78	12	25	15719	N17 W27	193	200	1.0

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
	N17 E67				B	10	1	AXX
	N17 E51				B	10	2	AXX

MCMATH REGION 15738 CMP DATE 24.1

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	27	15738	S21 W48	186	600	2.5
78	12	28	15738	S22 W62	188	1000	2.5
78	12	29	15738				

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20373	S22 W48	187	(BP)	3				
	S21 W64				B	30	4	BXO
	S22 W67				H	10	2	BXO

MCMATH REGION 15722 CMP DATE 25.1

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	21	15722	N20 E44	172	800	2.0
78	12	22	15722	N20 E34	172	400	2.0
78	12	23	15722	N20 E20	172	600	2.0
78	12	24	15722	N20 E05	173	700	2.5
78	12	25	15722	N20 W07	173	700	2.5
78	12	26	15722	N20 W22	175	900	2.5
78	12	27	15722	N20 W35	173	1000	2.5
78	12	28	15722	N20 W48	174	800	2.5
78	12	29	15722				

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20364	N19 E17	175	(B)	1	B	10	3	AXX
20364	N19 E04	175	(B)	2	B	40	6	DSO
	N20 W16				H	20	5	BXO
20364	N20 W23	176	(BP)	2	H	50	6	DRO
20364	N18 W38	177	(AP)	2	B	70	3	HAX
	N19 W50				B	60	3	BXO
	N19 W54				H	10	2	BXO

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MCMATH REGION 15736 CMP DATE 25.1

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	26	15736	S35 W20	173	100	1.5
78	12	27	15736	S35 W32	170	100	1.0
78	12	28	15736	S36 W45	171	200	2.5
78	12	29	15736				
78	12		15736				

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20375	S37 W50	162	(AP)	2	M	10	2	BXO
	S35 W62				M	10	1	AXX

MCMATH REGION 15723 CMP DATE 25.7

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	20	15723				
78	12	21	15723	N13 E52	164	1800	3.5
78	12	22	15723	N13 E42	164	2000	3.5
78	12	23	15723	N13 E28	164	1700	3.0
78	12	24	15723	N13 E14	164	1700	2.5
78	12	25	15723	N13 E01	165	1600	2.5
78	12	26	15723	N13 W12	165	1600	2.5
78	12	27	15723	N13 W25	163	1500	3.0
78	12	28	15723	N13 W38	164	1500	2.5

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20359	N12 E69	162	(AP)	4	B	40	1	HSX
20359	N11 E53	165	(B)	2	B	140	2	DAO
20359	N12 E43	161	(BF)	2	B	50	1	HSX
20359	N12 E30	162	(AP)	2	B	30	2	HRX
20359	N11 E17	162	(BF)	2	B	60	3	CSO
	N13 W05				M	50	5	CSO
20369	N13 W14	167	(B)	2	M	50	6	DRO
20369	N12 W30	169	(AP)	3	B	30	1	HSX

MCMATH REGION 15735 CMP DATE 26.4

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	24	15735	S26 E23	155	200	1.5
78	12	25	15735	S26 E10	156	400	2.5
78	12	26	15735	S26 W03	156	500	2.5
78	12	27	15735	S26 W17	155	400	2.0
78	12	28	15735	S26 W30	156	300	1.5
79	1	01	15726				
79	1	02	15726	N13 W67		2100	3.5
79	1	03	15726	N13 W80		1800	3.5

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20365	S26 E26	153	(B)	1	B	30	1	HSX
	S22 E06				M	20	5	BXO
20365	S25 W05	158	(B)	3	M	10	2	BXO
20368	N12 W54		(B)	3				
20368	N12 W67		(B)	3				

MCMATH REGION 15737 CMP DATE 26.4

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	26	15737	S11 W03	156	200	2.0
78	12	27	15737	S11 W17	155	300	2.0
78	12	28	15737	S11 W30	156	300	2.0

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20370	S11 W04	157	(B)	2	M	30	3	DRO
20370	S12 W17	156	(B)	2	B	20	2	CRO

MCMATH REGION 15724 CMP DATE 26.9

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	21	15724	S14 E64	152	900	2.5
78	12	22	15724	S14 E55	151	800	2.5
78	12	23	15724	S15 E42	150	500	2.0
78	12	24	15724	S15 E29	149	400	1.5
78	12	25	15724	S16 E17	149	400	1.0
78	12	26	15724	S16 E04	149	200	1.0

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS

MCMATH REGION 15725 CMP DATE 28.1 RETURN OF REGION 15683 ROTATION 4

CALCIUM PLAGE DATA

YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT
78	12	21	15725	S15 E83	133	1200	2.0
78	12	22	15725	S16 E74	132	900	2.0
78	12	23	15725	S16 E60	132	700	2.0
78	12	24	15725	S16 E46	132	900	1.5
78	12	25	15725	S16 E33	133	900	2.0
78	12	26	15725	S16 E20	133	1000	2.0
78	12	27	15725	S16 E06	132	1000	2.0
78	12	28	15725	S16 W07	133	700	2.0
79	1	02	15725	S17 W77		400	1.5

SUNSPOT DATA

NW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
20361	S17 E69	142	(AP)	2				
20361	S17 E56	142	(AP)	2	B	0	1	AXX
20361	S17 E43	136	(AP)	1				

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MCMATH REGION 15726 CMP DATE 28.7 RETURN OF REGION 15682 ROTATION 2

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	21	15726	N15 E88	128	500	1.5									
78	12	22	15726	N14 E78	128	600	3.0		N18 E70				B	20	1	AXX
78	12	23	15726	N14 E65	127	1200	2.5									
78	12	24	15726	N14 E52	126	1700	3.0	20368	N11 E57	122	B	2	B	70	2	CSO
78	12	25	15726	N14 E40	126	1600	3.0		N13 E39				M	50	9	DAO
78	12	26	15726	N14 E27	126	1700	3.0	20368	N12 E28	125	(BP)	3	M	50	7	DAO
78	12	27	15726	N14 E13	125	1500	3.0	20368	N12 E15	124	(B)	3	B	120	10	DAI
78	12	28	15726	N13 E01	125	1900	3.0		N12 E01				B	80	11	DRO
78	12	29	15726					20368	N13 W13	125	(BP)	4	M	100	16	DAO
78	12	30	15726					20368	N12 W24	124	(BY)	4	B	220	24	DAI
78	12	31	15726					20368	N11 W37	124	(B)	4	R	230	21	DAI

MCMATH REGION 15751 CMP DATE 29.4

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
79	1	03	15751	N18 W67		1100	3.5									
79	1	04	15751	N17 W80		1000	4.0									
79	1	05	15751	N16 W88		600	1.0									

MCMATH REGION 15730 CMP DATE 29.6

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	23	15730	N37 E76	116	1500	3.0									
78	12	24	15730	N37 E63	115	1400	3.0									
78	12	25	15730	N36 E50	116	1400	2.5									
78	12	26	15730	N36 E37	116	1500	2.5									
78	12	27	15730	N36 E25	113	1700	2.5									
78	12	28	15730	N36 E12	114	2000	2.0									
79	1	02	15730	N36 W54		1200	2.5									
79	1	03	15730	N37 W66		1000	1.5									

MCMATH REGION 15731 CMP DATE 29.7 RETURN OF REGION 15686 ROTATION 2

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	23	15731	N28 E78	114	600	3.0									
78	12	24	15731	N29 E65	113	900	2.5									
78	12	25	15731	N29 E53	113	600	2.0									
78	12	26	15731	N30 E40	113	400	1.5									
78	12	27	15731	N30 E26	112	400	1.5									
78	12	28	15731	N29 E14	112	400	1.5									

MCMATH REGION 15729 CMP DATE 29.8 RETURN OF PART OF REGION 15684 ROTATION 4

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	23	15729	S18 E84	108	1100	2.0									
78	12	24	15729	S18 E70	108	1100	2.0									
78	12	25	15729	S19 E57	109	700	2.0									
78	12	26	15729	S19 E44	109	700	2.0		S18 E48				M	120	9	DAO
78	12	27	15729	S20 E29	109	700	1.5									
78	12	28	15729	S20 E15	111	700	2.0		S18 E18				B	20	2	BXO
78	12	29	15729					20376	S19 E03	109	(AP)	3	M	20	2	CRO
78	12	30	15729					20376	S18 W08	108	(B)	2	B	40	5	DRO
78	12	31	15729						S19 W21				R	10	1	AXX
79	1	02	15729	S20 W49		800	1.5									
79	1	03	15729	S20 W62		400	1.0									
79	1	04	15729	S20 W75		400	1.0									

MCMATH REGION 15732 CMP DATE 30.4 RETURN OF PART OF REGION 15682 ROTATION 2

CALCIUM PLAGE DATA							SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	24	15732	N20 E80	98	500	2.0									
78	12	25	15732	N18 E65	101	700	2.5									

CONTD

REGIONS OF SOLAR ACTIVITY

DECEMBER 1978

MCMATH REGION 15732 (CONT) CMP DATE 30.4 RETURN OF PART OF REGION 15682 ROTATION 2

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	26	15732	N19 E51	102	1000	2.0									
78	12	27	15732	N19 E37	101	900	2.0	20374	N23 E23	116	(BY)	2	B	10	2	BXO
78	12	28	15732	N19 E23	103	1100	1.5									
78	12	31	15732					20384	N18 W25	112	(AF)	3	R	10	1	AXX
79	1	01	15732					20384	N18 W39		(AP)	3				
79	1	02	15732	N19 W46		1300	3.0	20384	N17 W55		(BP)	2				
79	1	03	15732	N19 W54		500	1.0									
79	1	04	15732	N17 W67		300	1.0									
79	1	05	15732	N19 W77		300	1.0									

MCMATH REGION 15734 CMP DATE 30.7 RETURN OF REGION 15684 ROTATION 4

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	24	15734	S29 E63	95	2400	3.5	20366	S30 E79	100	AP	2	B	250	5	DAI
78	12	25	15734	S29 E66	100	4000	3.5		S28 E60				M	200	8	DAO
78	12	26	15734	S29 E53	100	4800	3.0	20366	S30 E51	102	(B)	2				
78	12	27	15734	S29 E40	98	4800	3.0	20366	S29 E42	97	(B)	2	B	130	7	DSO
78	12	28	15734	S30 E27	99	4800	3.0		S29 E28				B	60	4	CSO
78	12	29	15734					20366	S29 E13	99	(BY)	3	M	60	5	DSO
78	12	30	15734					20366	S30 E03	97	(AP)	3	B	70	6	DSI
78	12	31	15734					20366	S30 W08	95	(AP)	3	R	30	5	CSO
79	1	01	15734					20366	S29 W22		(AP)	2	B	120	15	E
79	1	02	15734	S30 W37		4600	2.5	20366	S29 W35		(AP)	2	B	140	7	E
79	1	03	15734	S29 W50		3500	2.5		S33 W37				B	70	5	C
79	1	04	15734	S30 W60		3000	2.5									
79	1	05	15734	S30 W72		2400	2.0		S31 W64				B	70	2	H
79	1	06	15734	S32 W80		800	1.5		S31 W75				B	60	1	H
79	1	07	15734						S31 W89				B	30	1	H

MCMATH REGION 15733 CMP DATE 31.3 RETURN OF REGION 15687 ROTATION 3

				CALCIUM PLAGE DATA				SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	12	24	15733	S15 E85	93	2500	3.5	20367	S16 E85	94	AP	3	B	60	1	HSX
78	12	25	15733	S16 E73	93	5600	3.5		S15 E66				M	210	9	DAI
78	12	26	15733	S16 E60	93	5500	3.5	20367	S15 E58	95	(AP)	4	M	170	9	DSO
78	12		15733					20371	S18 E63	90	(AP)	3				
78	12		15733					20372	S24 E76	77	AP	1				
78	12	27	15733	S16 E48	90	5500	4.0	20367	S15 E44	95	(BY)	3	B	160	6	DSO
78	12		15733					20371	S18 E50	89	(AP)	3	B	60	2	CSO
78	12	28	15733	S17 E35	91	6200	3.5		S14 E32				B	120	4	DSO
78	12		15733						S17 E40				B	70	1	HSX
78	12	29	15733					20367	S15 E17	95	(B)	4	M	150	12	DSO
78	12		15733					20371	S18 E24	88	(AP)	4	M	110	5	DSO
78	12		15733					20378	S22 E33	79	(B)	3	M	70	1	HSX
78	12	30	15733					20367	S15 E04	96	(BY)	4	B	160	15	DSI
78	12		15733					20371	S17 E12	88	(AP)	4	B	100	4	DSO
78	12		15733					20378	S22 E18	82	(BY)	3	B	130	17	EAI
78	12	31	15733					20367	S16 W10	97	(BY)	4	R	120	11	DSO
78	12		15733					20371	S18 W02	89	(AP)	4	R	120	5	CSO
78	12		15733					20378	S22 E07	80	(B)	3				
79	1	01	15733					20367	S16 W23		(BP)	4	B	390	49	E
79	1		15733					20371	S18 W17		(AP)	4				
79	1		15733					20378	S22 W07		(BP)	3				
79	1	02	15733	S19 W27		6300	3.0	20367	S16 W36		(BP)	4	B	240	20	E
79	1		15733					20378	S22 W20		(B)	5				
79	1	03	15733	S19 W40		6500	3.0		S22 W37				B	500	37	E
79	1	04	15733	S20 W52		6100	3.0	20367	S16 W63		(AP)	3	B	330	12	E
79	1		15733					20371	S17 W55		(AP)	4				
79	1		15733					20378	S22 W45		(B)	4				
79	1	06	15733	S20 W70		2500	3.0	20371	S17 W80		(AP)	4	B	220	12	E
79	1		15733					20378	S23 W70		(B)	4				
79	1	07	15	733					S22 W90				B	240	6	E
79	1	05	15733	S20 W63		4800	3.0		S22 W52				B	280	16	E

NOTE: NO CALCIUM SPECTROHELIOGRAMS WERE SECURED AT THE MCMATH-HULBERT OBSERVATORY ON DEC 1,2,3,7,8,19,20,29,30 AND 31, 1978.
NO SUNSPOT OBSERVATIONS WERE MADE AT MT. WILSON ON DEC 17,18,19,25 AND 28, 1978.

ADDENDUM: The McMath Region 15683, which passed CMP on 30.9 November 1978, was the return of part of Region 15635, rotation 3. This Region appears in SGD 413 Part I, page 116, January 1979 issue.

REGIONS OF SOLAR ACTIVITY

DECEMBER 1978

DAILY CALCIUM PLAGE INDEX

DECEMBER 1978

YR	MO	DAY	INDEX	YR	MO	DAY	INDEX	YR	MO	DAY	INDEX
78	12	1	*	78	12	11	45.3	78	12	21	24.9
78	12	2	*	78	12	12	49.3	78	12	22	21.9
78	12	3	*	78	12	13	47.0	78	12	23	20.8
78	12	4	48.9	78	12	14	45.6	78	12	24	22.7
78	12	5	46.5	78	12	15	43.5	78	12	25	30.9
78	12	6	44.5	78	12	16	39.3	78	12	26	37.8
78	12	7	*	78	12	17	37.9	78	12	27	44.8
78	12	8	*	78	12	18	36.5	78	12	28	49.4
78	12	9	38.4	78	12	19	*	78	12	29	*
78	12	10	37.7	78	12	20	*	78	12	30	*
								78	12	31	*

* NO OBSERVATIONS

SUDDEN IONOSPHERIC DISTURBANCES

DECEMBER 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
01	1445	1510	1448	1-	3						4		1450E	15687
01	1956	2030	2002	1-	5				1	1	3		1955	15687
02	0435	0548D	0442	1	3	1			1				0438E	15687
02	0545	0632	0558	1	1				1				0549	15687
02	0802	0830D	0808	1-	1				1				0800	X-RAY
03	0456	0531	0500	1-	1				1				0452	X-RAY
03	1840	1910	1845	1-	5					1	5		1839	15696
03	2032	2103	2137	1	5	1		1	2	1	10		2036E	15696
04	0000	0030	0004	1-	1				1				*	
04	0208	0305	0221	1-	1				1				0205	X-RAY
04	0543	0700	0550	1+	3	1			1				0541	X-RAY
04	0940	0950	0942	1-	5			1	3		1		*	
04	1056	1130	1101	1-	5	2		6	4		3		1052	X-RAY
04	1320	1405	1325	1	5			5	4		6		1320	15694
04	1432	1445	1436	1-	3						4		1434	X-RAY
04	1501	1542	1514	1-	5				1		7		1453E	15682
04	1545	1620	1600	1-	5				1		7		1550	15694
04	1844	1924	1849	1-	5	1			2	1	11		1844	15694
05	0017	0047	0027	1-	1				1				0011	15694
05	0739	0855	0753	1	1				1				0742E	15687
05	0811	0835	0815	1-	1						1		0810	X-RAY
05	0950	1040	1012U	1-	1			1					0943	X-RAY
05	2317	2346	2323	;-	;				1				2315	15687
06	1853	1910	1900	1-	3				1		3		1854	15687
06	1941	2016	1950	1-	3				1		4		1942	15687
06	2103	2144	2112	1	5				2		2		2100	15697
06	2344	0126	0020	1-	3				2		1		2340	15697
07	0222	0328	0235	1-	1				1				0218	15691
07	0958	1115	1008	2	5	2		5	5		2		0958	15696
07	1146	1240	1157	1	1			1					*	
07	1942	2059	1957	1	5	1			3	1	6		1939	X-RAY
07	2214	2305	2224	1-	5			1	2				2224	15687
07	2344	0051D	2354	1+	1		2	1					2341	15687
08	0051E	0225	0058	1	5			2	1				0050	15697
08	0358	0437	0406	1-	1				1				0357	15684
08	0901	1000	0915	1	1		1						*	
08	0930	1026	0943	1-	1				1				*	
08	2044	2111	2051	1-	3				1		2		2043	15694
08	2242	2301	2247	1-	1				1				*	
09	1034	1150	1104	1-	3			7					1043	15700
09	1057	1230	1148	1	5	1		3	4		2		1104E	15697
09	2050	2106	2054	1-	1					1			2050	15700
09	2345	0023	2354	1-	1				1				2340	15697
10	0205	0318	0216	2-	5	1		1	1				0206	15684
10	0443	0605D	0452	1-	3			1	1				0440	X-RAY
10	0605E	0717	0615	1	3			1	1				0602	X-RAY
10	0827	0910	0835	1-	1				1				0824	15697
10	1112	1140	1125	1-	1				1		1		1108	15697
10	1343	1423	1358	1-	3			1	1		1		1339	X-RAY
10	1817	1838	1824	1-	5			1	1	1	11		1817	15697
10	;959	2021	2007	1-	5			1	1		9		1958	15697
10	2300	0024	0002	1-	1	1							2258	15696
10	2334	0244	2400	2	5			1	1		1		2332	15697
11	0344	0404	0348	1-	1				1				0341	15697
11	0406E	0508	0420	1-	1				1				0406	15697
11	1053	1125	1100	1-	5			3	2		2		1055	15697
11	1610	1650	1620	1-	5						9		*	
11	1756	1840D	1829	1-	5			1	1	1	12		1750	15689
11	1840	1912D	1858	1-	5			1	1	1	8		1833	15797
11	1915	2125	1950	1-	5	1		1	2	1	12		1909	X-RAY
12	0013	0100	0021	1-	1				1				0008	15694
12	0133	0238	0143	1	5	1		1	1				0129	15694
12	0308	0424D	0320	1	3	1			1				0308	15694
12	0513	0622	0525	1-	1				1				0523E	15694
12	0640E	0748D	0652	1-	1				1				0645	15697

SUDDEN IONOSPHERIC DISTURBANCES

DECEMBER 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TIME SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
12	0748	0807	0756	2	5			1	3				0753E	15694
12	0827	0853	0836	2	3			3	1				0825E	15694
12	1002	1150	1042	2	5	2		5	4		2		1005	15697
12	1208	1309	1211	1	3			2					1211	15697
12	1230	1245	1235	1	1			1	1				1231	15700
12	1332	1350	1337	1-	1						1		1328	15694
12	1418	1437	1421	1-	3						4		1414	15694
12	1502	1650	1523	2	5	2	1	3	3	1	10		1503	15689
12	1658	1728	1708	1	5			1			6		1655	15689
12	1808	1836	1814	1-	5				2	1	7		1806	X-RAY
12	1836	1856	1840	1-	5		1		2	1	6		1836E	15689
12	1924	1948	1934	1-	5			1	1		4		1926E	15694
12	2006	2110	2020	1-	5			1	2	1	7		2008	15697
12	2134	2200	2139	1-	5				2	1	3		2136E	15696
12	2227	2253	2232	1-	5				2		1		2226	X-RAY
12	2303	2352	2314	1-	5				2		1		2301	15694
13	0011	0202D	0046	2	3	1			1				0013E	15694
13	0036	0058	0043	1-	1	1							0034	15697
13	0202E	0341D	0240	1-	1				1				0210E	15697
13	0341E	0617D	0413	2+	3	1			1				0340	15697
13	0435	0500	0448	1-	1	1							0435E	15697
13	0519	0550	0523	1-	3	1		1					0513	15697
13	0617E	0901	0626	1	3	1			1				0617	15694
13	0925	0954	0930	1-	3			3					*	
13	1014	1202	1028	2+	5	4	1	5	4		3		1011	X-RAY
13	1204	1245	1215	1-	3				1		1		1202	15694
13	1234	1250	1237	1-	1						1		1234	15697
13	1446	1508	1455	1-	1			1					1442	15694
13	1658	1747	1714	1	5			1		1	7		1657	15697
13	1823	1918	1833	1	5	1		1	1	1	11		1822	X-RAY
13	1914	1945	1923	1	5						7		1906	15694
13	2010	2038	1	5				1	3		12		2008	15694
13	2040	2128	2050	1-	5				2		11		2037	15697
13	2325	0224D	0006	3	2			1	1		1		2325	15697
13	2353	0154	0005	?	5			1	2		1		2353	15694
14	0223	0309	0233	1-	3			1	1		1		0221	X-RAY
14	0352	0500	0407	1-	3	1			1				0355	15694
14	0426	0451	0428	1-	3	1		1			1		0428	15697
14	0648	0720D	0654	1-	1				1				0647	X-RAY
14	0716E	0852	0728	2	3	1		1	1		1		0714	X-RAY
14	1110	1203	1122	1-	5			1	3		2		1109	X-RAY
14	1342	1355	1345	1-	1						1		1339	15697
14	1400	1510	1420	1	5				2		6		1359	X-RAY
14	1539	1605	1540	1-	5	1					7		1536	X-RAY
14	1624	1726	1636	1-	5	1			2	1	12		1623	15694
14	1834	1850	1840	1-	5				1		5		1832	X-RAY
14	1903	1915	1908	1-	5				1		5		1900E	15697
14	2020	2145	2034	1-	5				3	1	8		2024	15697
14	2308	0024	2322	1	3				2				2307	X-RAY
15	0218	0305	0228	1	1				1				0217E	15697
15	0400	0458D	0406	1-	1				1				0401E	15700
15	0458E	0556	0516	1	1				1				0456	X-RAY
15	0554E	0650	0602	1	1				1				0552	X-RAY
15	0722	0950	0756	1	1				1				0721	X-RAY
15	1343	1400D	1400	1-	1				1		1		1341E	15700
15	1653	1722	1702	1-	5					1	4		1654	15697
15	2052	2112	2058	1-	1				1				2055	15696
15	2240	2325	2248	1+	5			1	2		3		2239	15696
16	0136	0246	0140	1-	3			1	1		1		0134	X-RAY
16	0352	0421	0402	1-	5	1		1	1		1		0350	15696
16	0618	0644	0622	1-	1				1				0617	15696
16	0947	1048	0955	1-	3				1		1		0941	15696
16	2034	2108	2045	1-	1				1				2036	15696
17	0206	0319	0222	1-	3				1		1		0201	X-RAY
17	0341	0423	0400	2-	5	1			1		1		0350E	15704
17	0734	1018	0748	3	5			3	1		1		0733	15697
17	1655	1700D	1700	1	5		1	1	2	1	10		1645	15704
17	1810	1903	1817	1-	5	1	1	1	2	1	11		1807	15697
18	0028	0100	0039	1-	1				1				0033	15697
18	0228	0330	0238	1-	1				1				0226	15700
18	0840	0855	0842	1-	1						1		0839	X-RAY
18	1417	1515	1430	1-	1				1		1		1416	15697
18	2347	0105	2354	1+	5	1		1	2				2348	15697

SUDDEN IONOSPHERIC DISTURBANCES

DECEMBER 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
19	0345	0446	0406	1-	1				1				0341	X-RAY
19	0830	1019	0842	1-	1				1				0833E	15697
20	0643	0900	0650	1+	1				1				0640	X-RAY
21	1403	1445	1415	1-	1				1		1		1357	X-RAY
21	1648	1758	1700	1-	5			1	1		10		1646	15704
22	0412	0555	0424	1	1				1		10		0409	X-RAY
22	1247	1350	1300	1-	3				2		1		1244	X-RAY
22	1838	1916	1844	1-	5			1	2		11		1836	15731
23	0716	0833	0729	1	1				1				0710	X-RAY
23	1616	1628	1613	1-	5			1	1	1	8		1601	X-RAY
23	1732	1808	1736	1-	5			1	2	1	11		1728	X-RAY
23	2225	2326	2236	1-	5				2		1		2221	X-RAY
24	0009	0109	0012	1	1				1				0006	15733
24	2224	2317	2234	1-	5				2		3		2218	X-RAY
25	0006	0053	0014	1-	1				1				0003	X-RAY
25	0444	0537	0456	1-	1				1				0443	X-RAY
25	0600	0650	0610	1-	1				1				0559	X-RAY
25	1407	1510	1415	1-	5			2			5		NF	
26	0321	0403	0329	1	1				1				0327E	15733
26	0537	0700	0554	1	1				1				0536	X-RAY
27	1630	1758	1647	2	5	1	1	1	2		12		1627	15733
28	1152	1205D	1205	1-	1				1		1		1153	15733
30	0541	0813	0604	1+	3	1			1				0546	15746
30	0853	0858	0855	1-	1				1				0851	X-RAY
30	1218	1402	1252	1-	3						3		1216	15745
30	1611	1637	1615	1-	5					1	4		1609	15726
30	2258	2350	2313	1-	3				2				2250	15733
31	0312	0421	0325	1	1				1				0308	15733
31	0540	0708	0550	1-	1			1			1		0540	15733
31	0904	0910	0907	1-	1				1				0905	X-RAY
31	1610	1647	1622	1	5			1	2	1	10		1607	X-RAY

PERIODS OF NO OBSERVATIONS:

DATE	TIME (UT) and STATION
04	1130-1400 UM (13 kHz)
05	0000-2400 A3, 0000-2400 TN, 1005-1350 UM (16 kHz)
07	2015-2022 TM
08-09	0000-2400 A3
12	0000-2400 TN, 1005-1345 UM (16 kHz)
16	0000-2400 A3
17	0450-0635 UM (13 kHz), 1120-1140 UM (13 kHz)
19	0000-2400 A3, 1915-1530 UM (16 kHz)
20	1655-1745 UM (13 kHz and 10 kHz)
22-31	0000-2400 CL
22	0443-1630 TM
24	1815-1910 UM (16 kHz)
25-26	0000-2400 A3

STATIONS REPORTING FOR DECEMBER 1978

AAVSO (A1, A3, A19, A21, A26, A28, A31, A45, A46) (SES) (A1, A31) (SEA)
CHILWORTH (CL) (SCNA)
DARMSTADT (DA) (SWF)
HERSTMONCEUX (HC) (SEA)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA)
INUBO (IN) (SPA)
KUHLUNGSBORN (KU) (SEA, SPA)
JULIUSRUH (JH) (SWF)
MC MATH (MC) (SWF, SCNA)
NEW JERSEY (NJ) (SES)
PANSKA VES (PU) (SWF, SEA, SES)
PRESTON (LO) (SES)
SAO PAULO (UM) (SES, SPA)
SOFIA (SF) (SES)
SOMERTON (SO) (SWF)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (TM) (SPA, LF-SPA)
UPICE (UI) (SEA)
VSETIN (VS) (SEA)
ZILINA (ZL) (SEA)

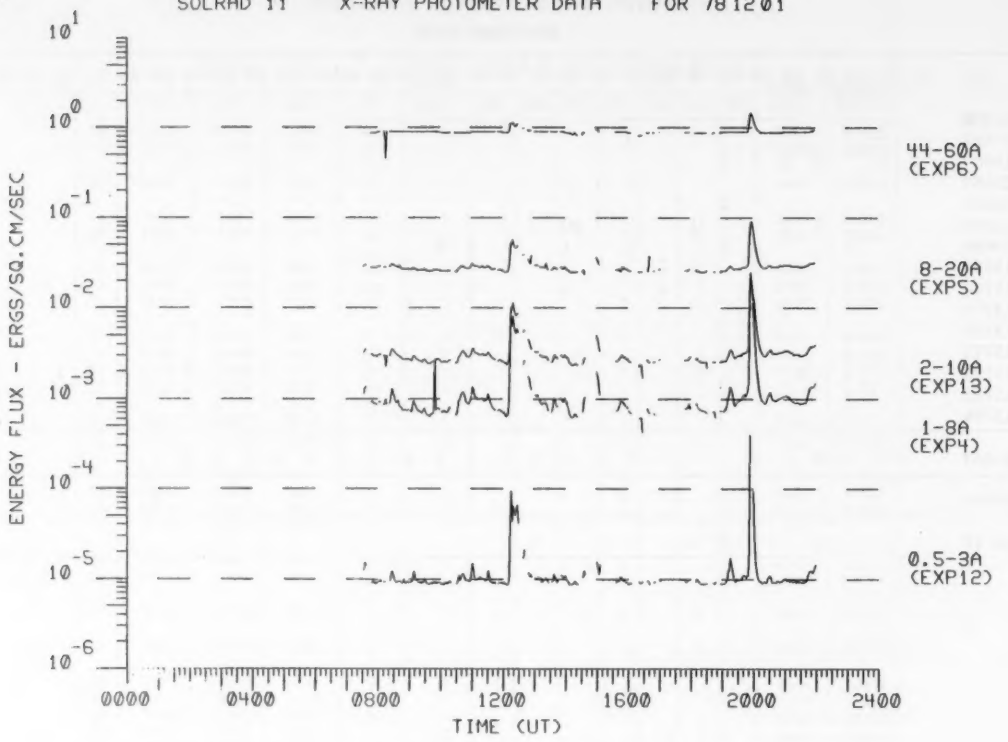
Note: Zilina is a new station reporting for the first time from Zilina, Czechoslovakia

SIDs BY McMATH REGION

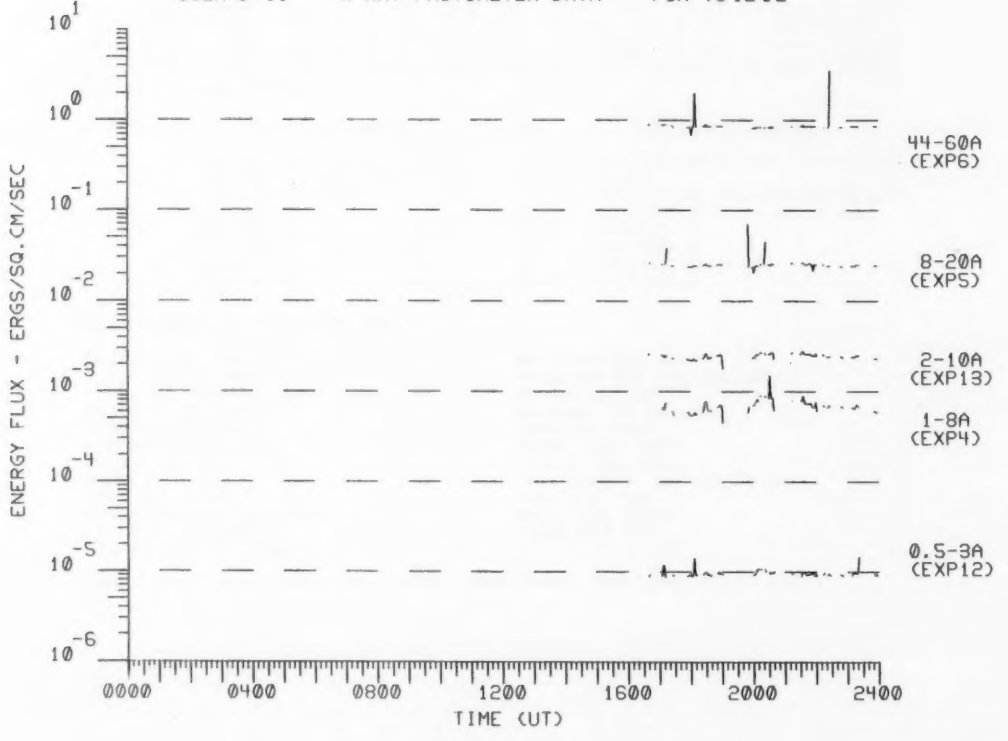
DECEMBER 1978

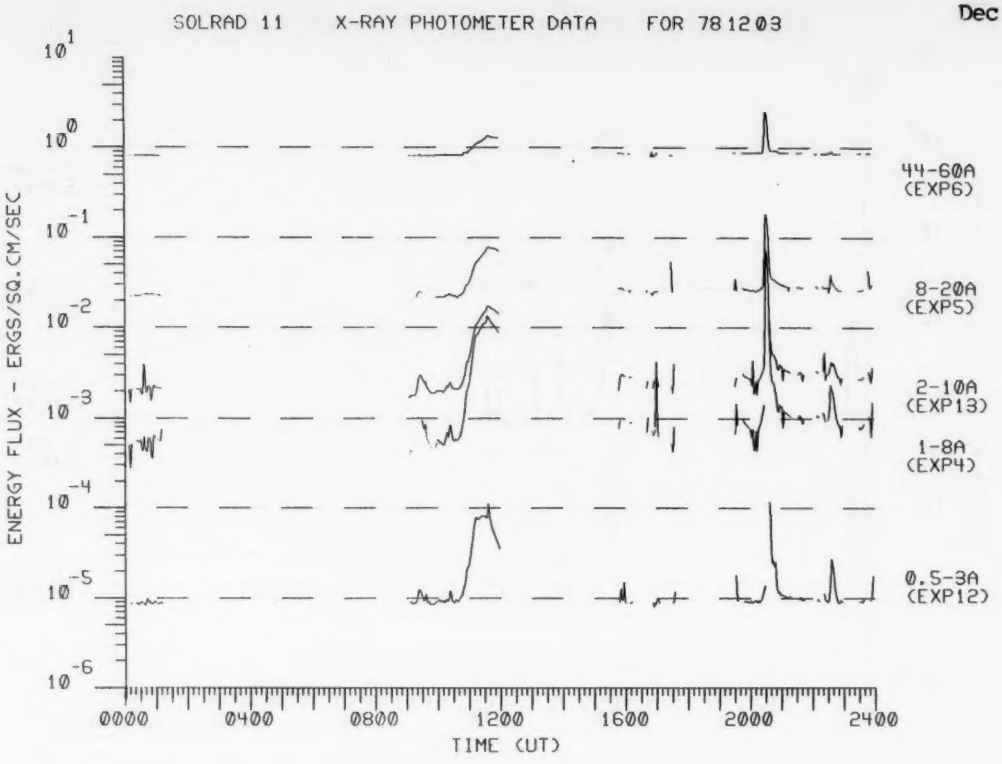
DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
REGION																															
15684								1		1																					
15687	2	2		1	2	2	2																								
15689											1	3																			
15691							1																								
15694				3	1			1				10	7	2																	
15696			2				1			1		1			2	4															
15697						2		1	2	5	4	4	9	4	2		2	3	1												
15700									2			1			2			1													
15704																	2					1									
15726																														1	
15731																						1									
15733																								1		1	1	1		1	2
15745																														1	
15746																														1	
X-RAY		1	1	4	2	1				3	1	2	2	8	3	1	1	1	1	1	1	2	4	1	3	1			1	2
UNKNOWN																									1						
NO FP				2			1	3			1		1																		

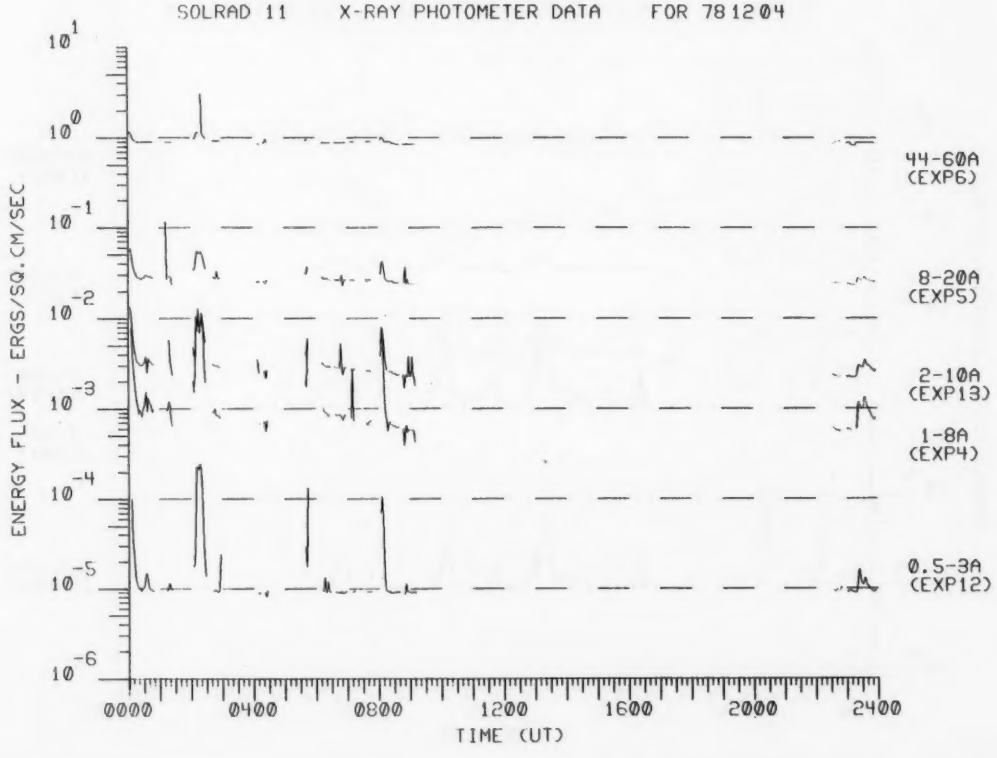
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781201



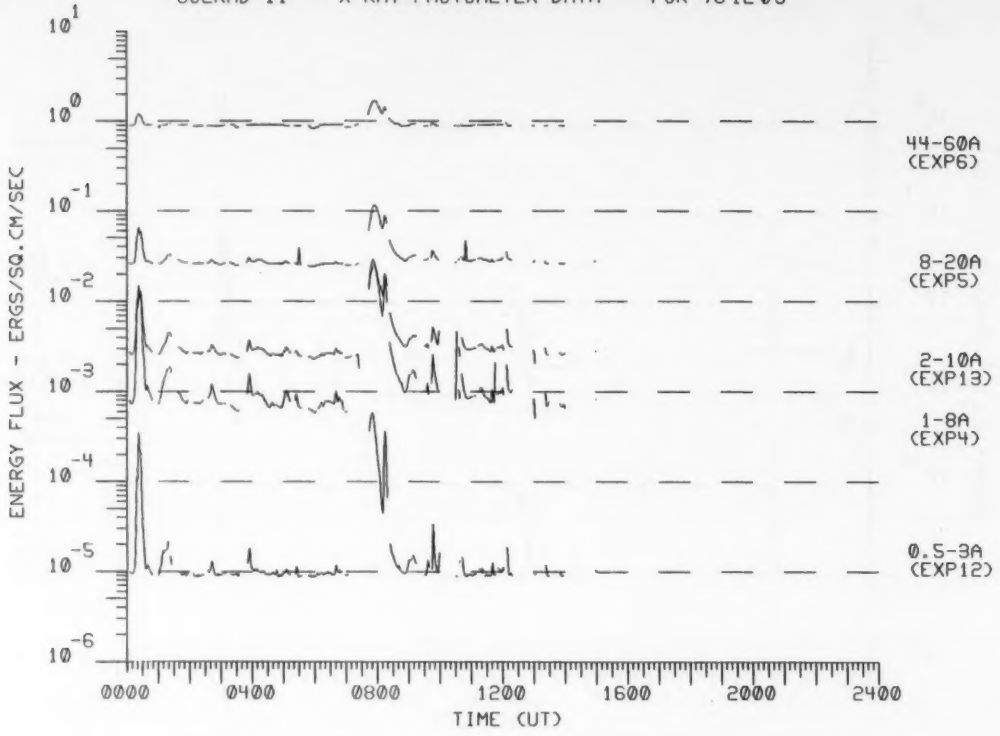
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781202



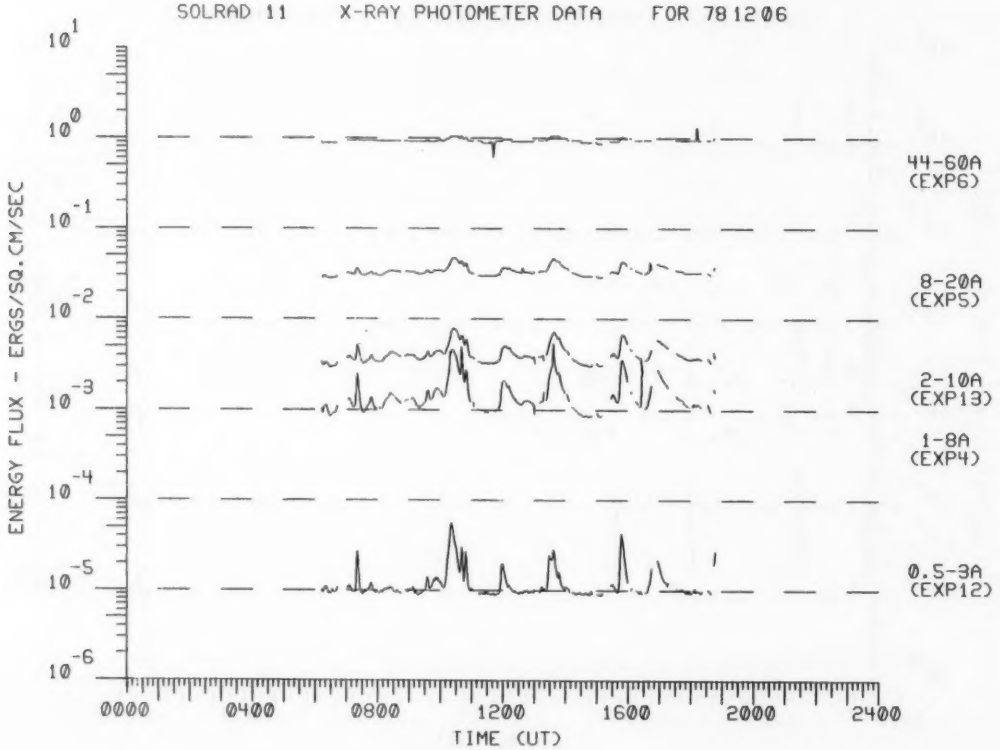

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781203
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781204
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

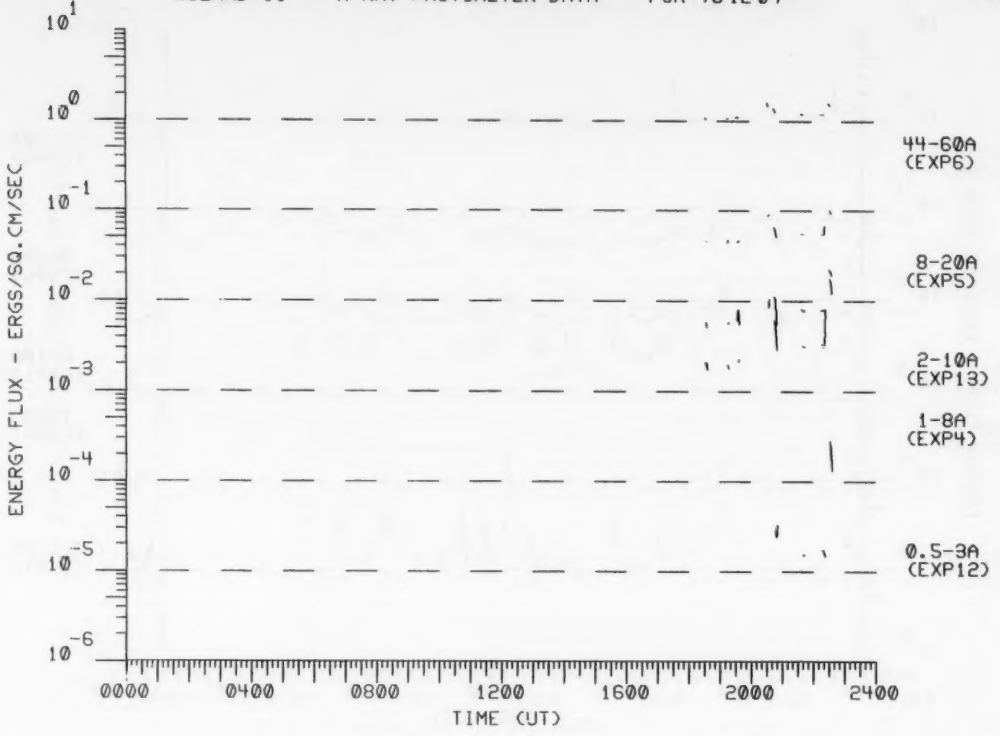
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781205



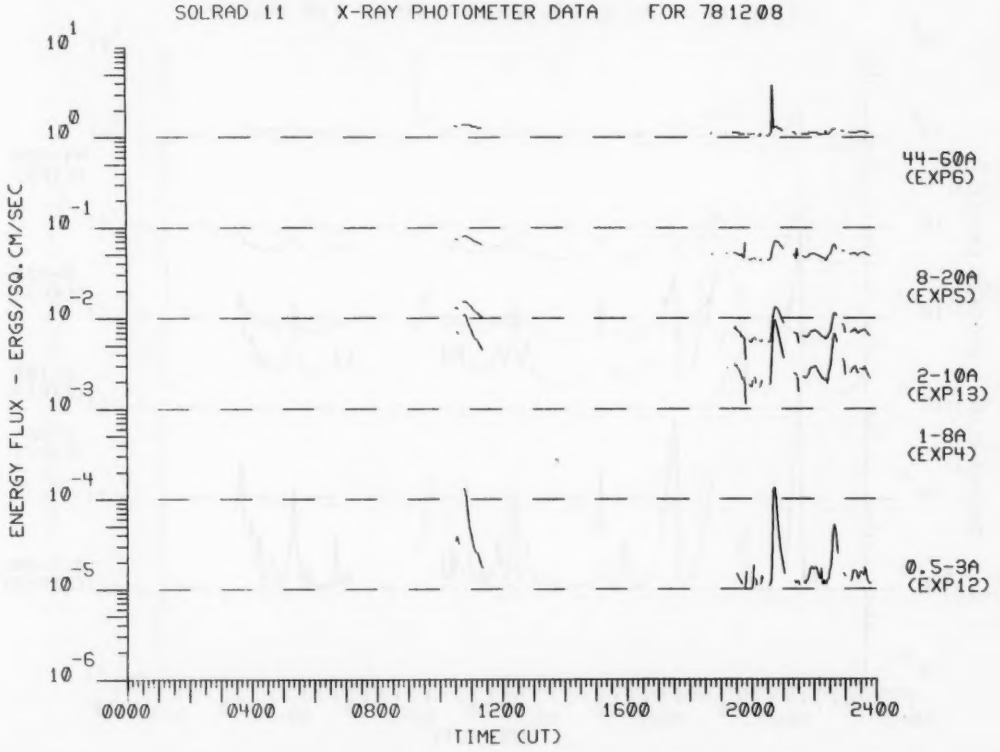
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781206

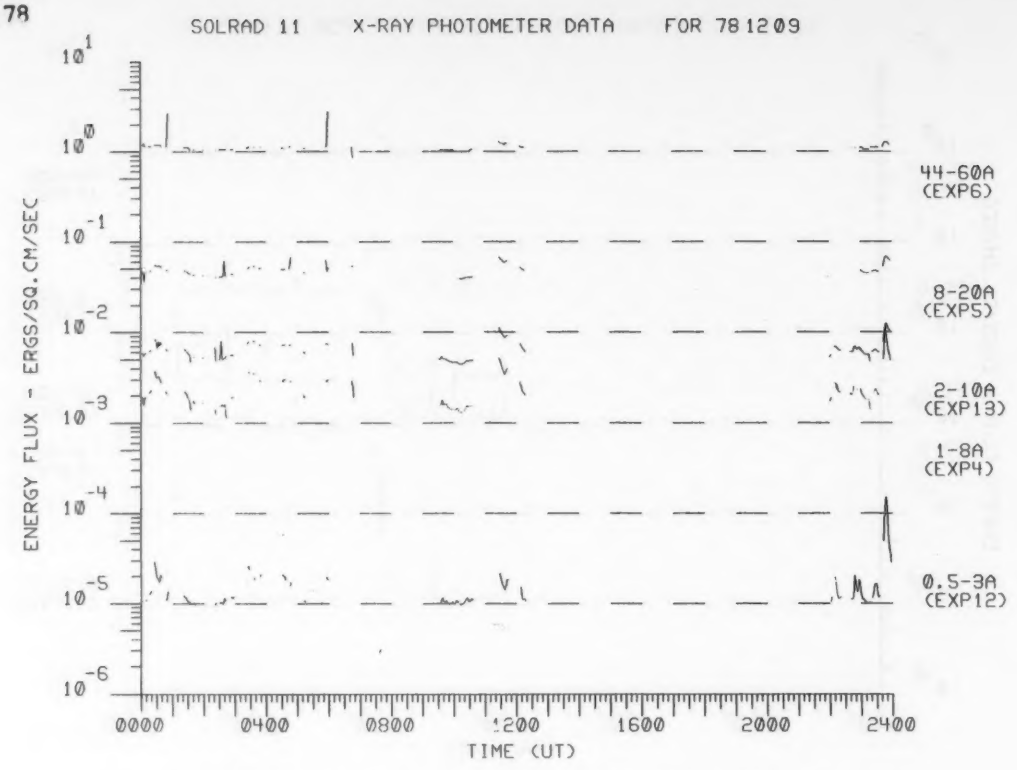


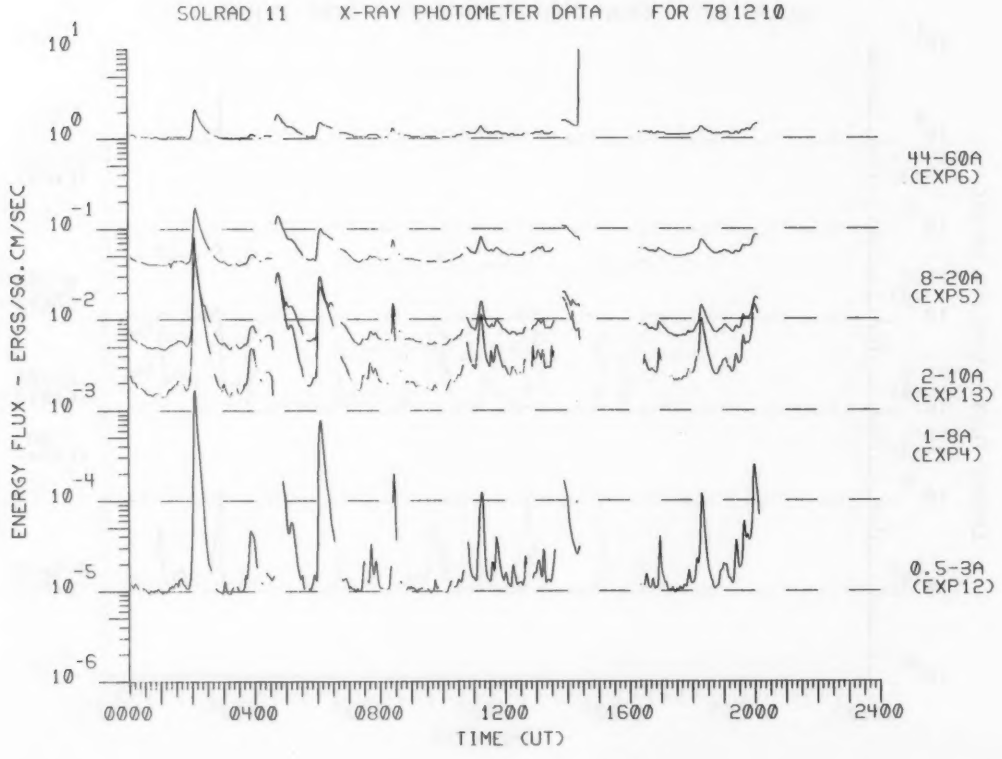
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781207

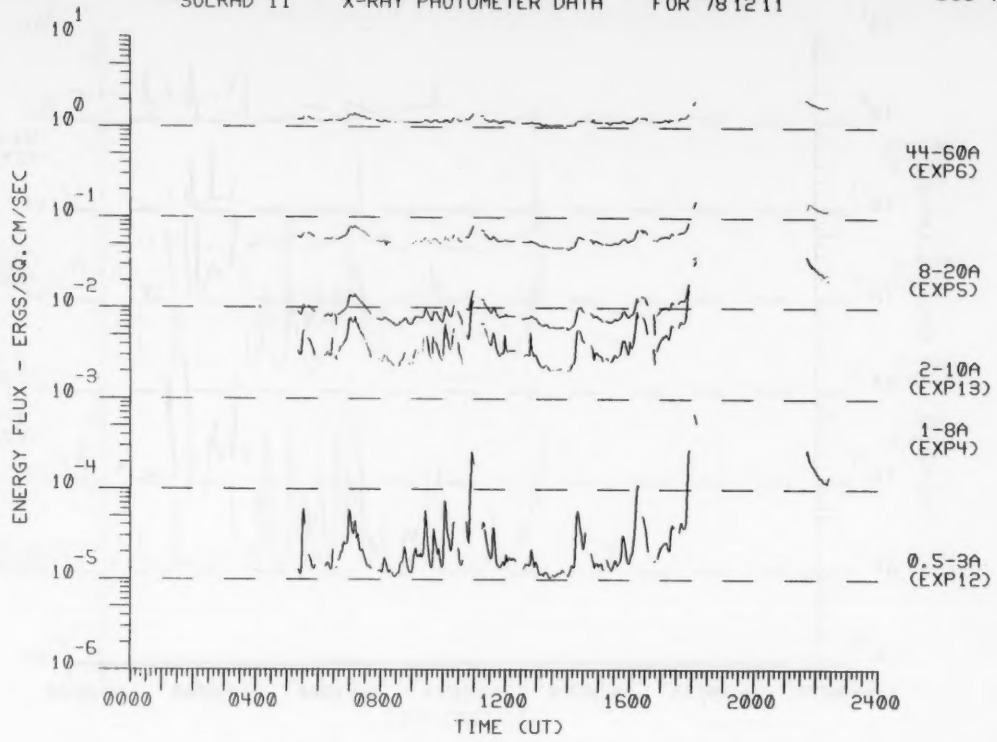


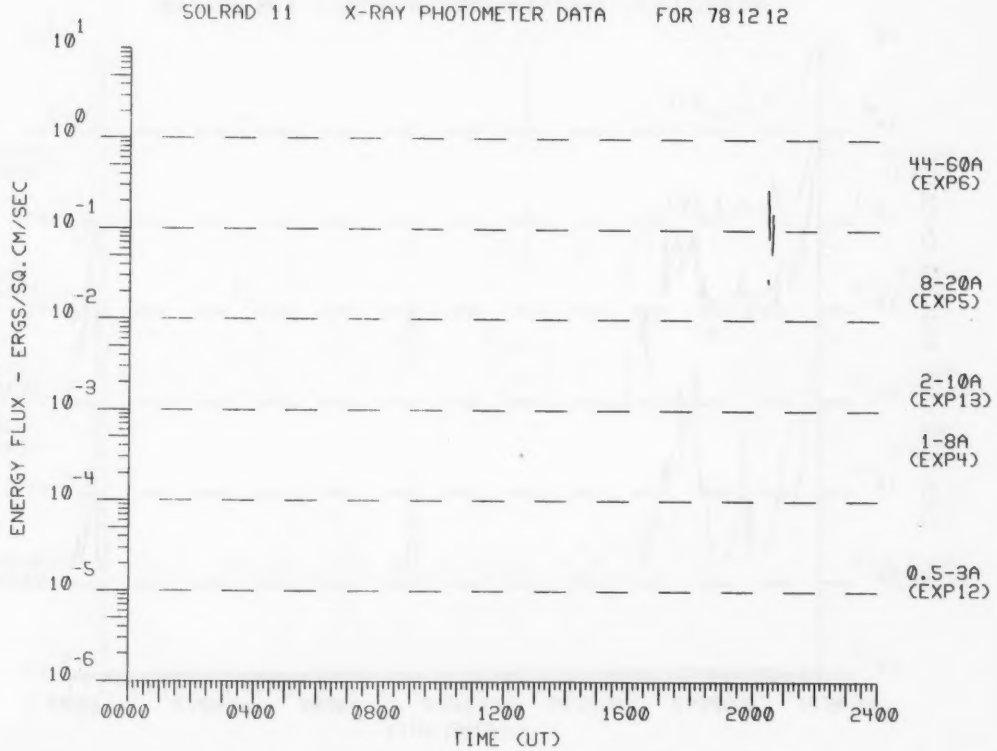
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781208

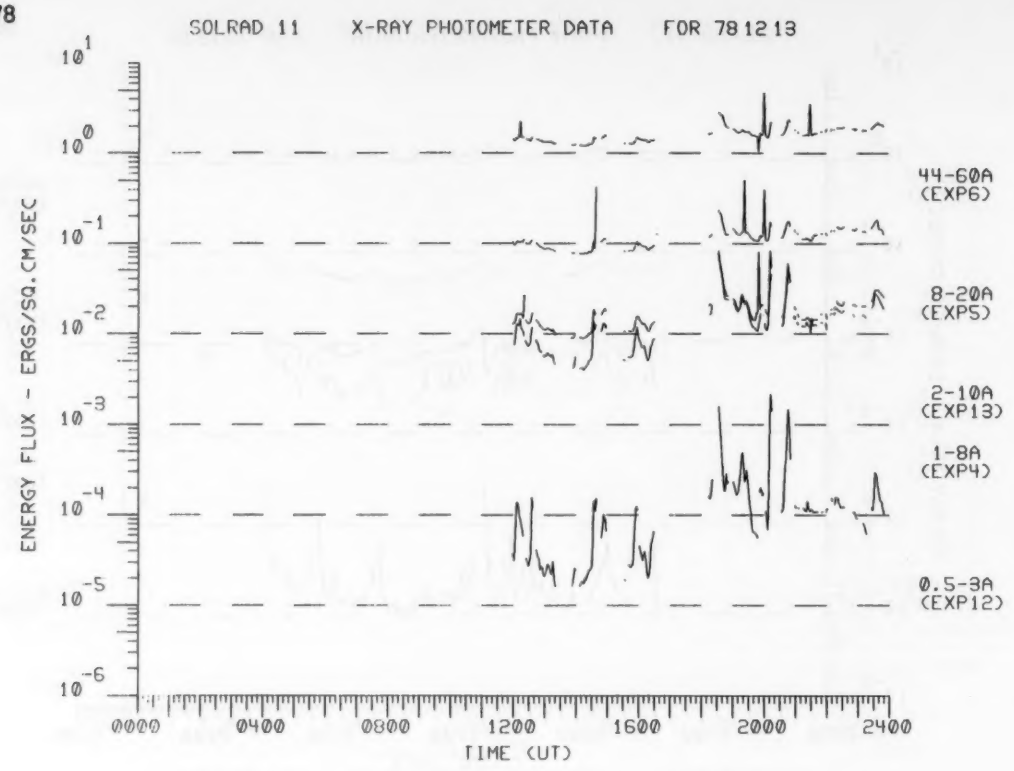


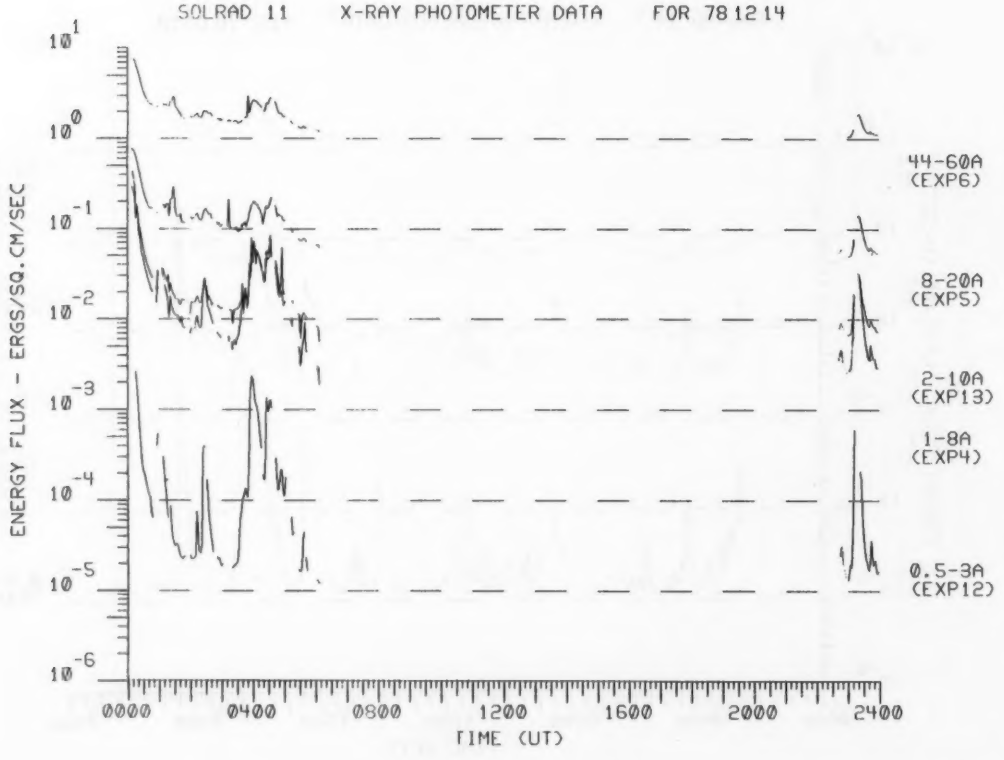

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781209
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

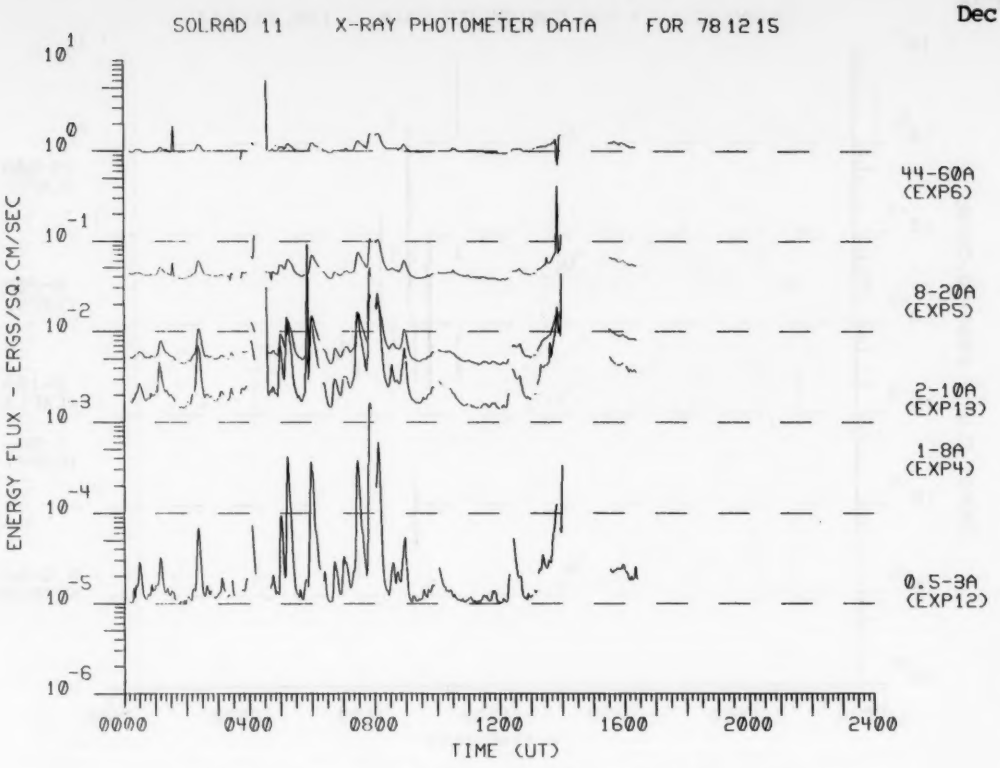

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781210
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

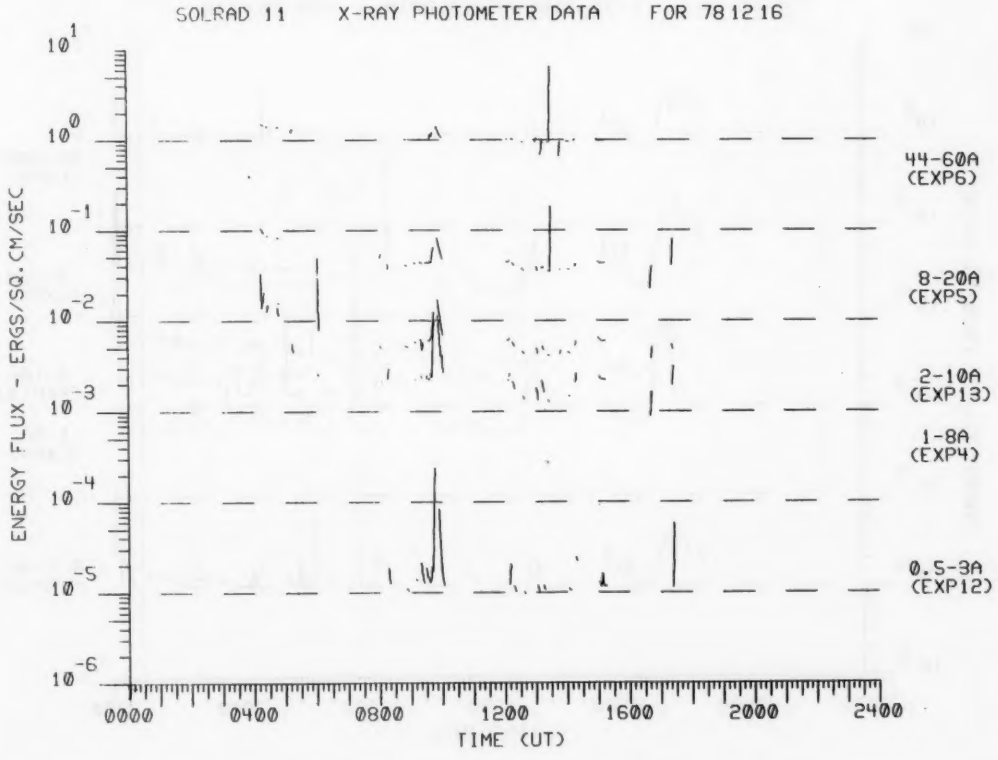

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781211
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

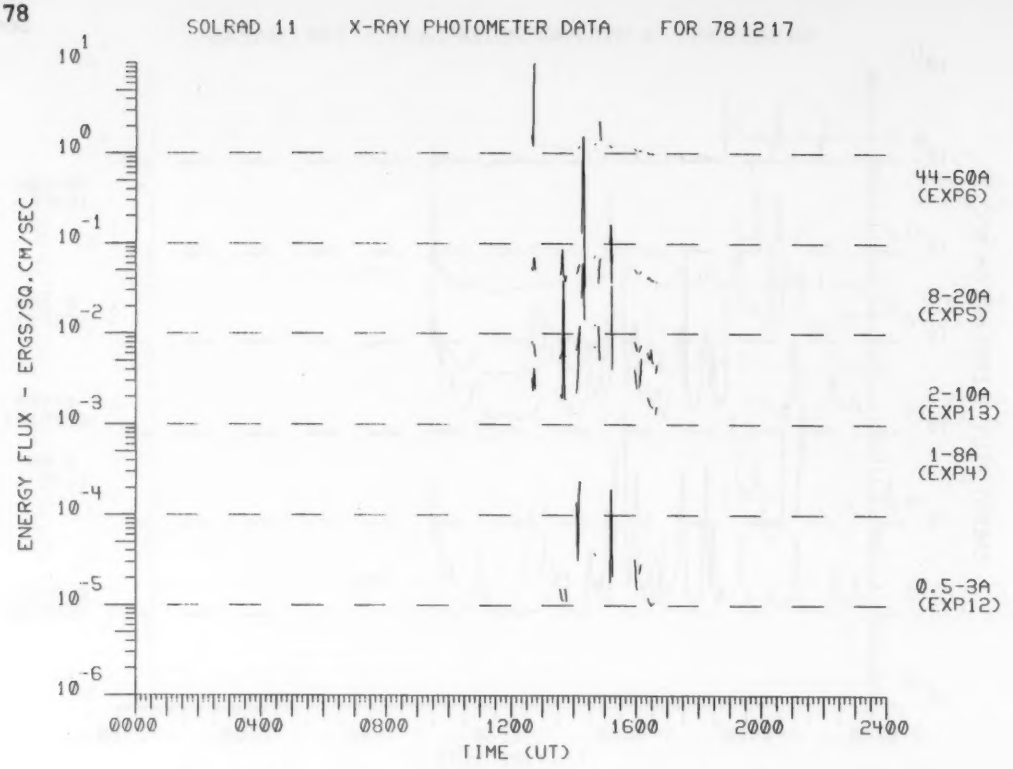

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781212
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

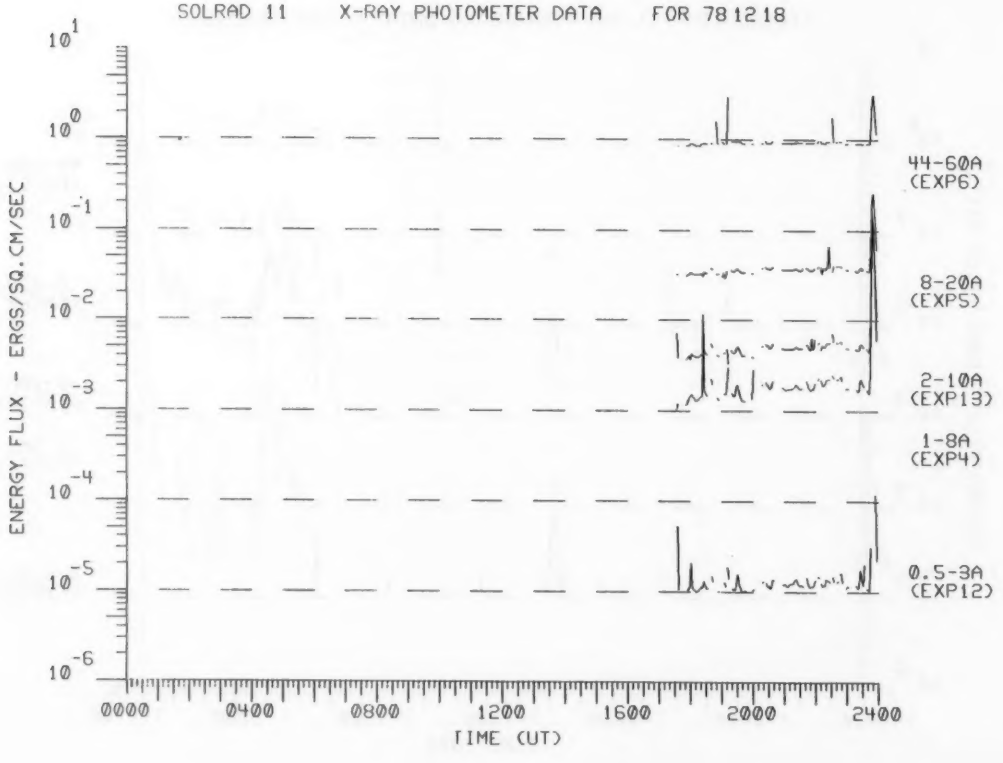

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781213
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

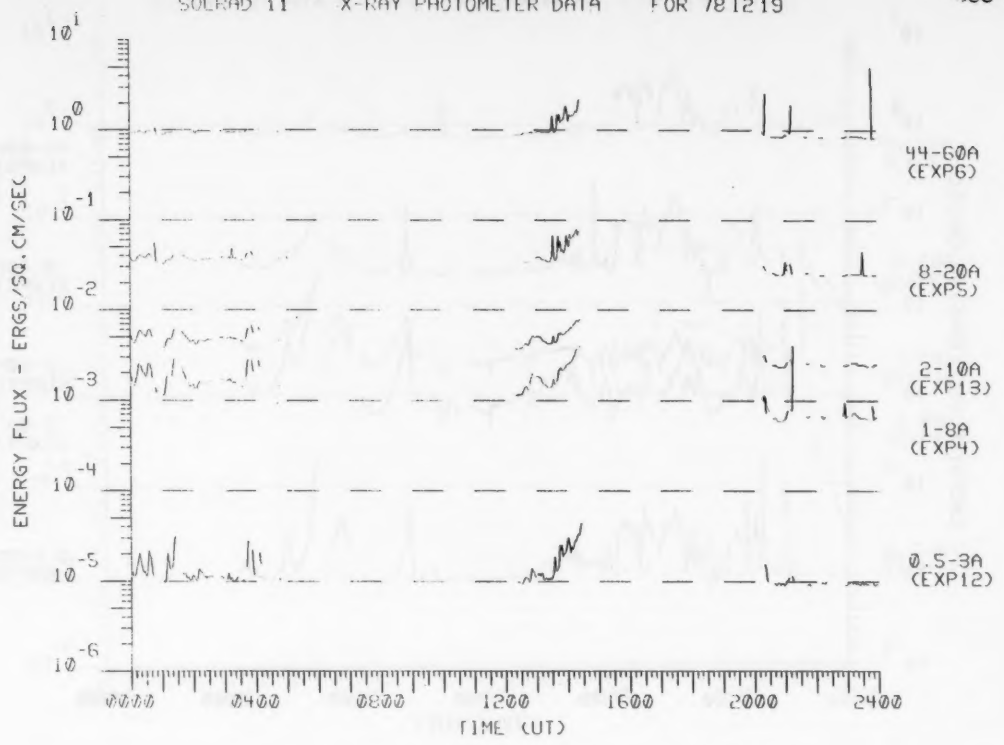

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781214
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

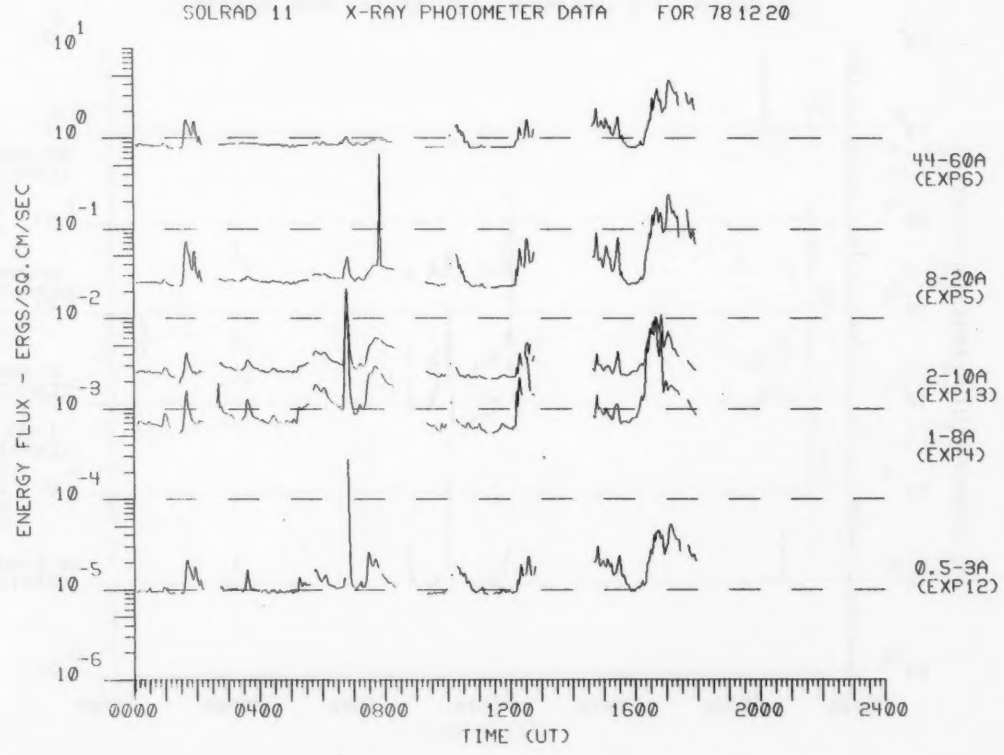

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781215
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

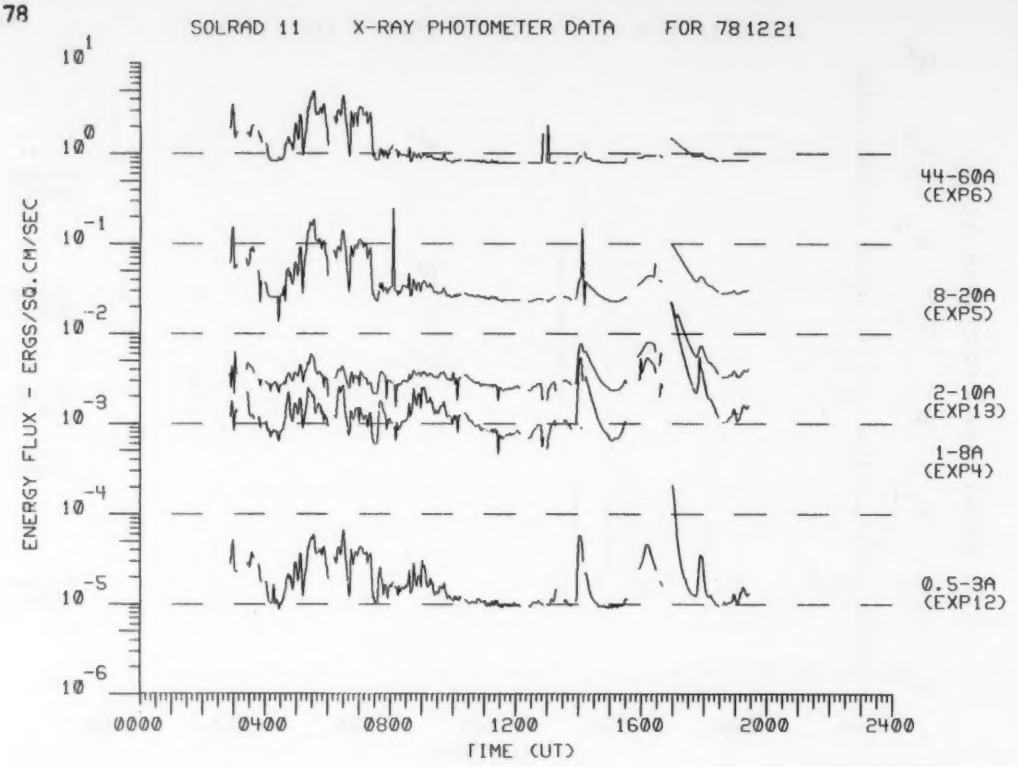

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781216
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

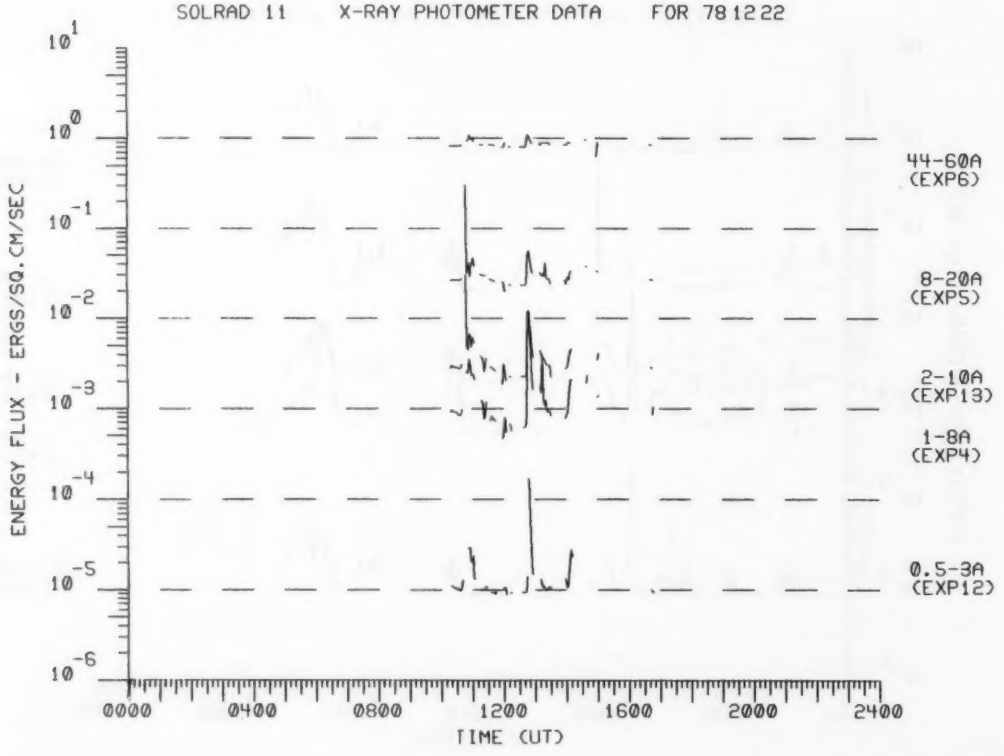

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781217
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

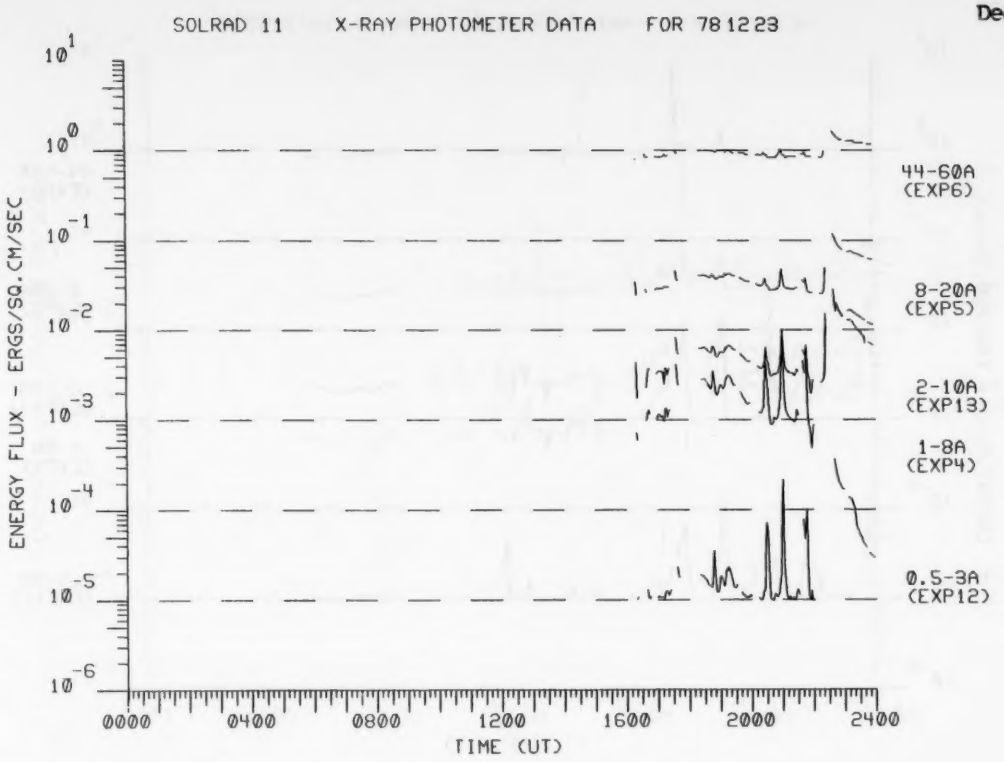

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781218
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

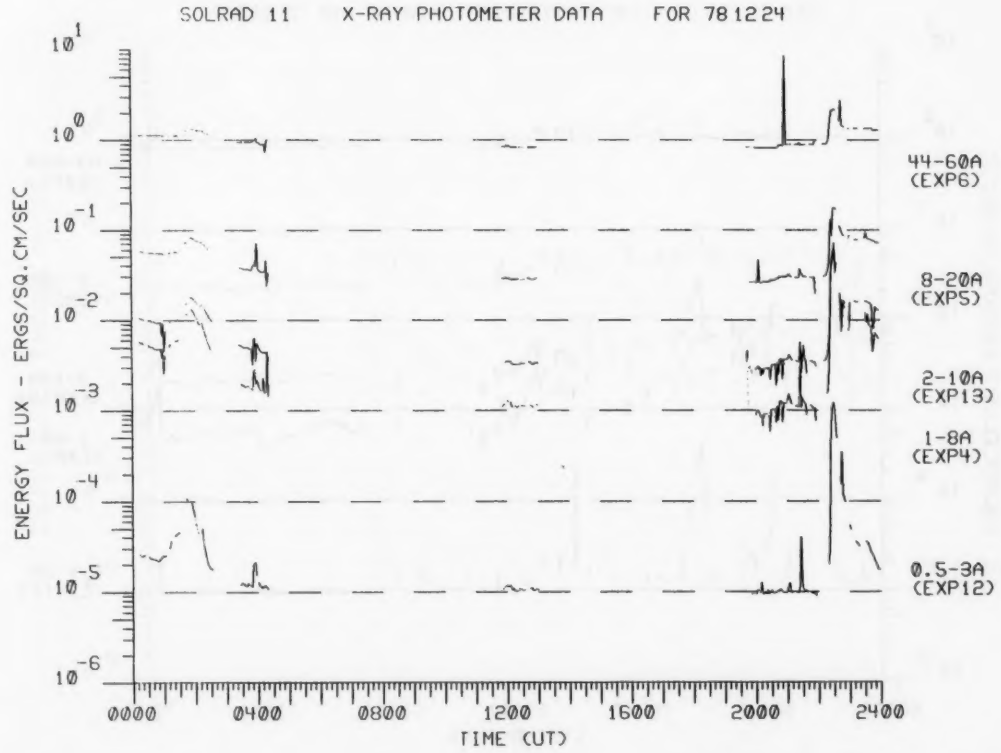

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781219
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

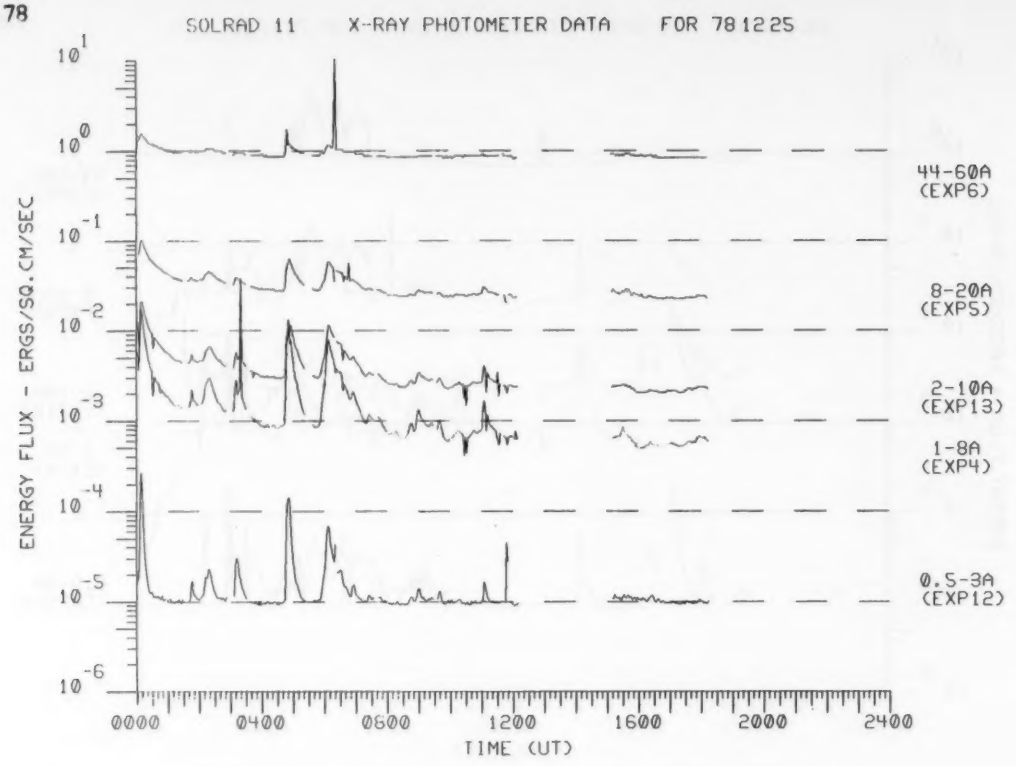

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781220
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

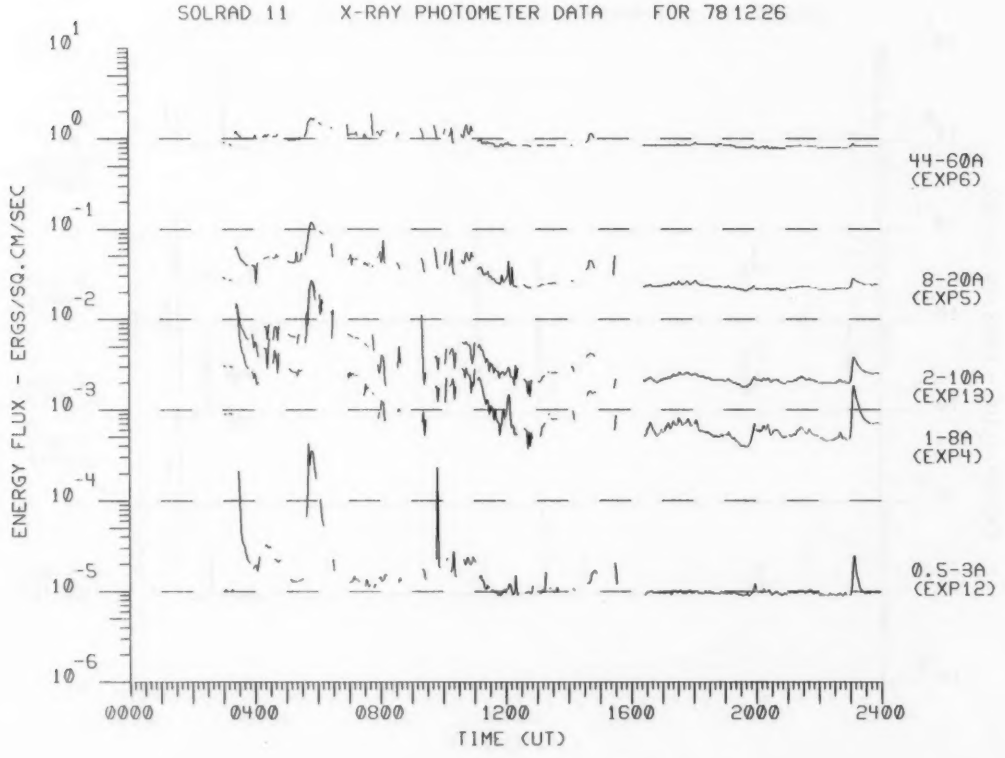

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781221
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781222
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

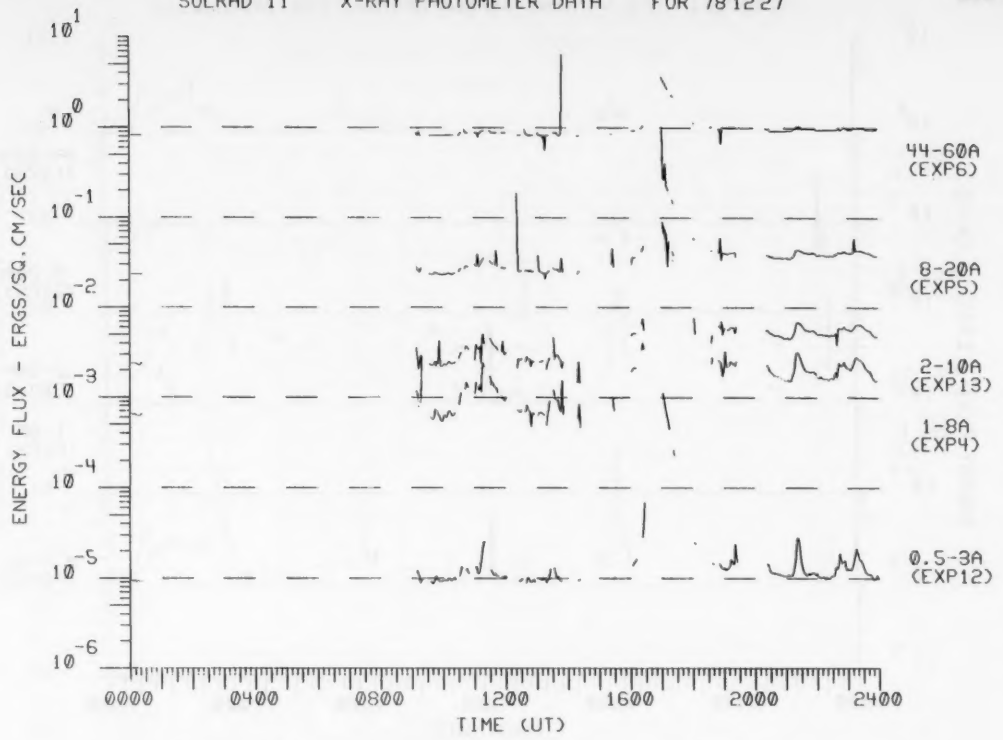

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781223
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781224
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

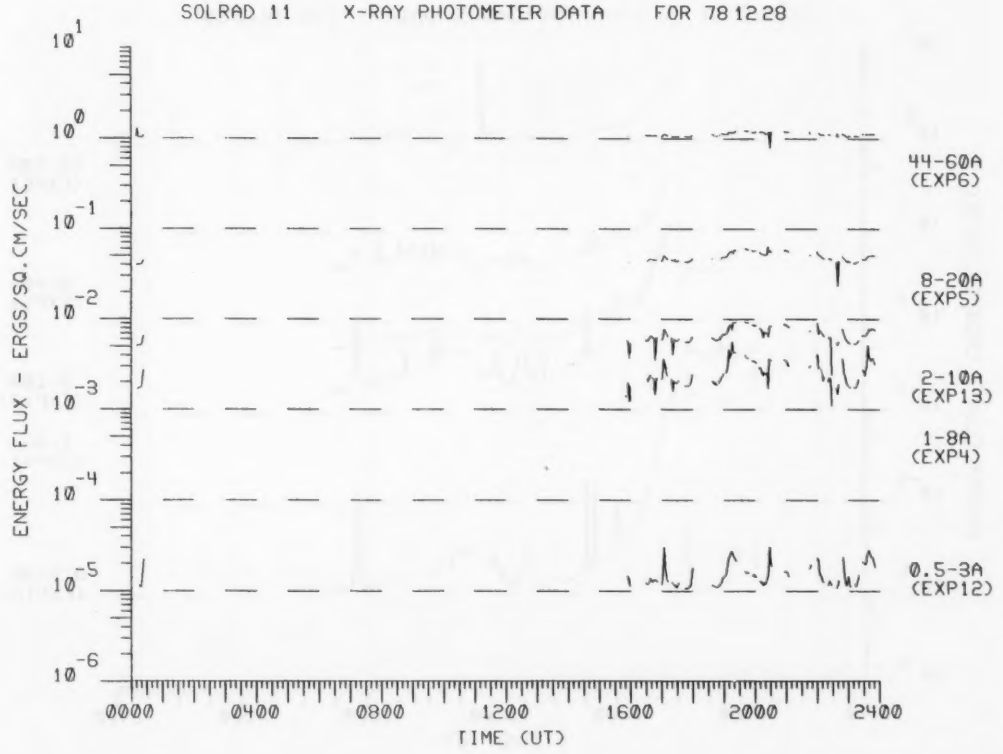

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781225
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

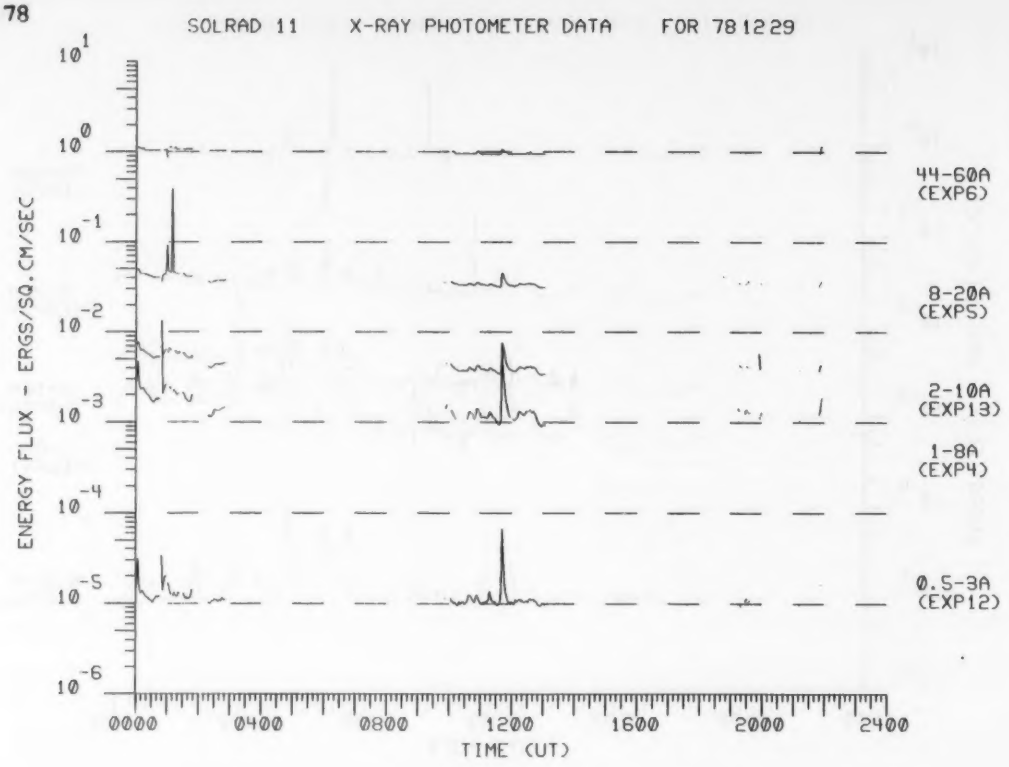

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781226
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

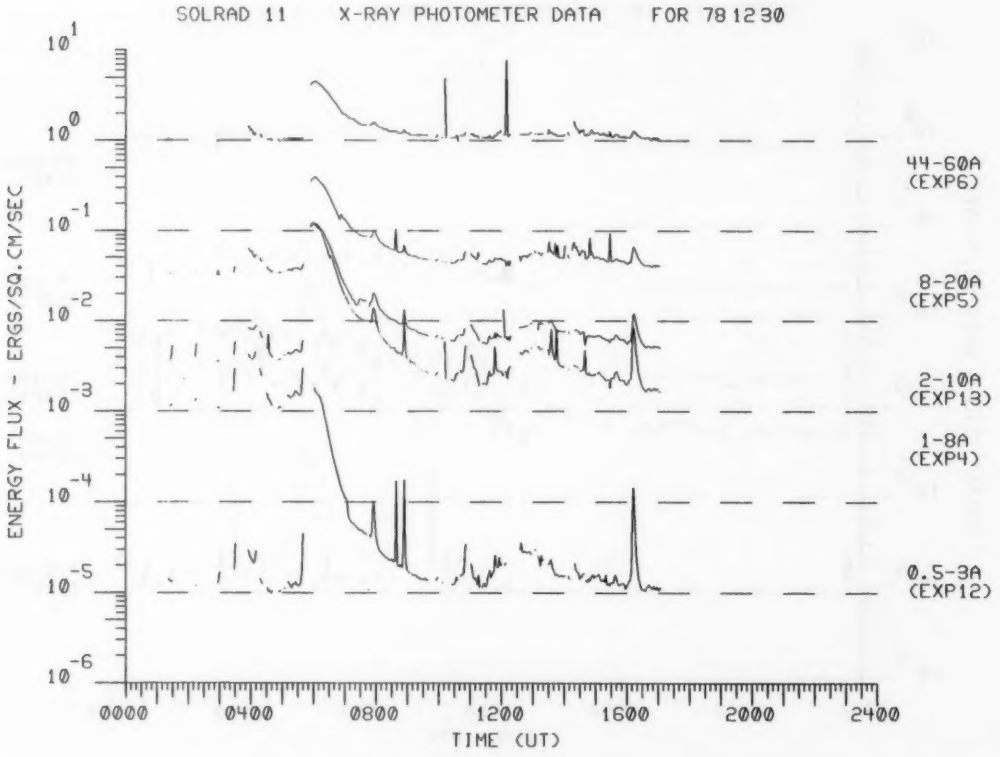
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781227

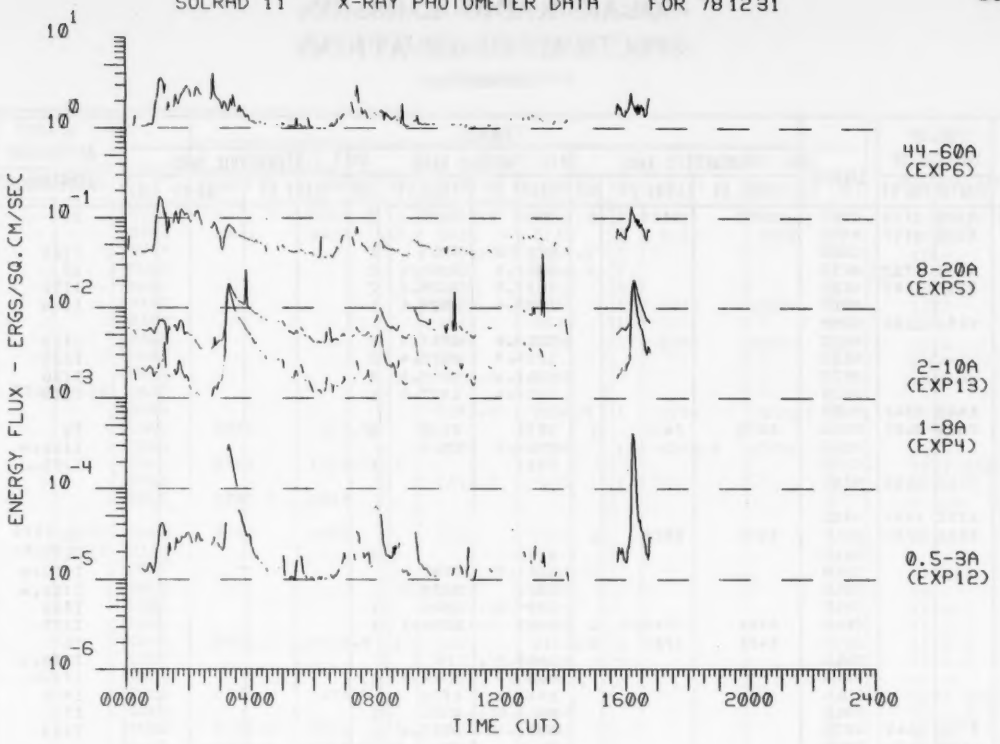


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781228




SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781229
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781230
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 781231
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

DECEMBER 1978

DEC 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
01	0000	0720	CULG	0000	0720	1	0000	0037	1				IS
	0000	0857	MANI										
			CULG				0718.5	0719	1				IIIG
	0733	0737	WEIS				0742.0	1150.0	1				IS
	0843	1449	WEIS				1027.9	1028.2	2				IIIG
			WEIS				1029.4	1029.6	1				IIIG
	1158	2106	SGMR										
			WEIS				1213.5	1217.3	2				IIIG
			WEIS				1224.9	1229.4	3				IIIG
			WEIS				1241.4	1242.6	2				IIIG
			WEIS				1327.4	1327.6	1				IIIB
	1400	2340	HARV										
	2021	2400	CULG	2021	2400	1	2021	2109	1				IS
			CULG				2024.5	2026					IIIG,W
			CULG				2025		1				IIIB,U
	2200	2400	MANI										
02	0000	0858	MANI										
	0000	0721	CULG	0000	0421	1							IS
			CULG				0108		1				IIIB
			CULG				0141.5	0142					IIIG,W
			CULG				0328	0328.5					IIIG,W
			CULG				0329.5	0330	1				IIIG
			CULG	0343	0344.5	1	0343	0344.5	1				IIIG
			CULG	0421	0721	1							IS
			CULG				0458.5						IIIB,W
			CULG				0538.5	0540.5	2				IIIGG
			CULG				0547	0721					IS,W
			CULG				0549.5	0551	1				IIIG
	0735	1449	WEIS				0932.9	0933.4	2				IIIG
	1159	2106	SGMR										
			WEIS				1227.2	1232.0	2				IIIG
			WEIS				1246.7	1249.5	3				IIIGG
	1400	2340	HARV				1503		1				IIIG,U,W
	2021	2400	CULG	2021	2154	1							IS
			CULG				2039	2400					IIIN,W
			CULG				2046		1				IIIB
			CULG				2109		1				IIIB
			CULG	2119	2119.5	1							FAST DRIFT
			CULG				2149		1				IIIB,U
			CULG	2149	2150	1							IIIG
	2208	2400	MANI										
			CULG				2251		1				IIIB
03	0000	0900	MANI										
	0000	0559	CULG				0232	0232.5					IIIB,W,U
			CULG				0246	0246.5	1				IIIG
			CULG				0304	0306					IIIG,W
			CULG				0317	0317.5					IIIG,W
			CULG				0318	0318.5	2				IIIG
			CULG				0327	0327.5	2				IIIG
			CULG				0342	0342.5					IIIG,W
			CULG				0347.5		2				IIIB
			CULG				0423		1				IIIB
			CULG				0429						IIIB,W,U
			CULG				0448.5						IIIB,W
			CULG				0451.5	0457	3				IIIGG,U
	0742	1100	WEIS				0826.3	0827.3	1				IIIG
			WEIS				0832.7	0832.8	1				IIIG
			WEIS				0845.2	0845.3	1				IIIB
	1143	1448	WEIS				1252.3	1254.3	3				IIIG
			WEIS				1434.3	1436.2	2				IIIG
	1400	2340	HARV				1645	1646	3	1645	1646	3	IIIG,V
			HARV				1711		2	1711		2	IIIB
	1200	2106	SGMR				1839.9	1840.4	2				IIIG
			HARV				1839	1840	3	1840		3	IIIG
			HARV				1937	1939	3	1937	1939	3	IIIG
			SGMR				2021.0	2022.0	1				IIIG
	2022	2400	CULG	2023	2400	1							IN
			CULG				2024	2025					IIIG,W

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

DECEMBER 1978

DEC 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
03			CULG	2031.5	2036	3	2031.5	2040.5	3	2032	2032.5	2	IIIGG,V
			HARV	2031	2033	2	2031	2033	3	2032	2033	3	IIIG,V
			SGMR				2032.0	2032.6	2				IIIG
			CULG				2033	2043.5	2				II, H
			HARV				2034		3				UNCL
			HARV				2035	2036	3	2035	2036	3	IIIG
			HARV				2037	2039	1				UNCL
			HARV				2040	2041	2	2040	2041	1	IIIG
			HARV				2043						UNCL
			CULG				2048.5	2204					IIIN,W
	2200	2400	MANI										
			CULG				2233.5	2234.5	1	2234	2234.5	1	IIIG
			CULG	2234	2234.5								F D,W
			CULG				2235	2236	1	2235.5	2236	1	IIIG
			CULG	2325	2326.5	1							FAST DRIFT
			CULG				2356.5	2400	1				IIIG
			CULG	2357.5	2358								F D,W
04	0000	0722	CULG	0000	0722		0001	0020					IS,W
	0000	0900	MANI										
			CULG				0001.5	0002.5					IIIG,W
			CULG				0020	0133	1				IS
			CULG				0108.5	0109	1				IIIG,U
			CULG				0119.5	0120					IIIG,W
			CULG	0121	0121.5	1	0121	0121.5	1				IIIG,U
			CULG				0127.5	0128	1				IIIG,U
			CULG				0133	0450	1				IS,DC
			CULG	0234	0234.5	1							FAST DRIFT
			CULG				0516.5	0517					IIIG,W
			CULG	0529.5	0531	1	0529.5	0530	1				IIIG
			CULG	0544.5	0546.5	2	0545	0548	2				IIIGG
			CULG	0545.5	0551.5	2							IV, P
			CULG				0545.5	0547.5	1				II
			CULG							0546	0547		IIIG,W
	0736	1448	WEIS				0741	1414.0	2				IS,DC
			WEIS				0753.5	0753.8	1				IIIG
			WEIS				0802.0	0804.3	2				IIIG
			WEIS				0806.9	0908.8	1				IIIG
			WEIS				0937.4	0941.6	3				IIIG
			WEIS				1054.6	1058.7	3				IIIGG
			WEIS				1101.9	1102.7	3				IIIG
			WEIS				1135.6	1136.5	1				IIIG
			WEIS				1139.2	1139.3	2				IIIB
			WEIS	1145	1315	2							CONT
			WEIS				1147.9	1148.6	2				IIIG
			WEIS				1153.7	1154.1	1				IIIG
			WEIS				1203.2	1203.5	1				IIIB
			WEIS				1212.1	1212.7	2				IIIG
			WEIS				1227.7	1228.7	2				IIIG
			WEIS				1233.8	1234.7	1				IIIG
			WEIS				1252.3	1254.2	3				IIIG
	1201	2105	SGMR				1253.2	1254.0	1				III
			WEIS				1306.3	1306.4	3				IIIG
			WEIS				1310.7	1311.2	2				IIIG
			WEIS				1313.5	1313.6	2				IIIB
			WEIS				1315.4	1326.1	3				IIIGG
			SGMR				1320.3	1321.6	3				V
			WEIS				1347.3	1347.8	2				IIIG
			WEIS				1355.6	1355.7	1				IIIG
	1400	2340	HARV	1411		1							IIIGW
			HARV	1414		1							IIIGW
			WEIS				1431.2	1431.6	2				IIIG
			HARV				1431		1				IIIB
			WEIS				1436.7	1436.9	2				IIIG
			WEIS				1441.8	1442.0	2				IIIG,RS
			HARV				1442		1				IIIGW
			HARV	1454		2							IIIG
			HARV	1521		2							IIIG
			HARV	1527		1							IIIG
			HARV				1530		2				IIIG

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DEC 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
04			HARV	1547	1549	3	1548	1550	3	1548	1550	3	IIIGG,V
			SGMR				1548.2	1549.4	3				V
			HARV	1549	1551	2	1549	1551	2				UNCL
			HARV	1555		1							IIIG
			HARV	1623		2							IIIG
			HARV	1647		1							IIIG
			HARV	1712	1714	1							IIIG
			HARV	1733	1734	2							IIIG
			HARV	1742	1743	2							IIIG
			HARV	1749	1950	3							IIIG
			HARV	1817	1819	2							IIIG
			SGMR				1844.6	1845.7	3				V
			HARV	1844	1845	3	1844	1845	3	1844	1845	3	IIIG,V
			HARV	1845	1846	3	1845	1846	2				II
			HARV	1921		1							IIIG
			HARV	1930	1932	1							IIIG
			HARV	1934		2							IIIG
	2022	2400	CULG	2025	2038	1							IS
			CULG	2041.5	2042	1							IIIG
			CULG				2044.5		1				IIIB,U
			CULG	2044	2046	1							IIIG
			HARV	2044	2045	2							IIIG
			CULG				2045		1				IIIB
			CULG				2048.5	2049	1				IIIG,U
			CULG				2120.5	2121.5					IIIG,W
			CULG	2125.5	2128.5	1							FAST DRIFT
			CULG				2126.5						IIIB,W
			CULG	2156	2400								IN,W
	2205	2400	MANI										
			CULG	2209		1	2209		1				IIIB
			CULG				2333.5	2336	3	2334	2335.5	2	IIIG,V,U
05	0000	0722	CULG	0000	0001								F D,W
	0000	0900	MANI										
			CULG				0012	0013.5	2				IIIG,U
			CULG	0015	0026	1	0015	0026	2	0016.5	0018.5	2	IIIGG
			CULG	0031.5	0032	1	0031.5	0032.5	1				IIIG
			CULG	0036.5	0037	1	0035.5	0037.5	1				IIIGG
			CULG				0057	0057.5					IIIG,W
			CULG	0121	0226								N,F D,W
			CULG	0157	0157.5	2							FAST DRIFT
			CULG	0212.5	0215.5	1							IIIGG
			CULG				0213	0213.5					IIIG,W
			CULG	0224.5	0226	1							FAST DRIFT
			CULG	0510	0512	1							I
			CULG	0519		1							IIIB
	0738	1447	WEIS				0743.0	1426.0	2				IN
			WEIS				1235.5	1236.4	1				IIIB,U
	1400	2340	HARV	1424	1426	2							IIIGG
			WEIS				1429.2	1429.3	2				IIIB,U
			HARV				1734		2				IIIB
	1202	2105	SGMR				1919.9	1920.6	1				IIIG
			HARV				1920		2				IIIB
			HARV	2011	2012	2							IIIGG
			HARV	2040	2042	2							IIIGG
	2023	2400	CULG	2040	2042.5	2							FAST DRIFT
			CULG				2103	2103.5	2	2103	2103.5	1	IIIG
			HARV				2103		2	2103		2	IIIB
			HARV	2104	2105	2							IIIG
			CULG	2104	2105	1							FAST DRIFT
	2200	2400	MANI										
			CULG	2334	2340	1							FAST DRIFT
06	0000	0900	MANI										
	0000	0722	CULG				0027						IIIB,W
			CULG	0256.5	0258	2							FAST DRIFT
			CULG				0542		2				IIIB
			CULG				0545		2				IIIB
			CULG				0616.5	0617					IIIG,W
			CULG				0623	0623.5					IIIG,W

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DEC 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
06	0739	0948	WEIS	0935.7	0936.4								IIIRS
	1203	2105	SGMR										
	1311	1315	WEIS				1311.5	1314.6	1				IIIG
	1400	2340	HARV	1844		2							IIIG
	2022	2400	CULG				2136.5	2137					IIIG,W
	2201	2400	MANI										
07	0000	0900	MANI										
	0000	0723	CULG	0006	0006.5	1							FAST DRIFT
			CULG	0012	0013	1							FAST DRIFT
			CULG				0031	0128	1				IS,W
			CULG	0306.5	0311								F D,W
			CULG	0347	0354.5	1							IIIGG
			CULG				0349		1				IIIB
			CULG				0351.5	0355					IIIG,W
			CULG				0407	0410	2				IIIGG
			CULG	0432		1	0432		1				IIIB
			CULG				0438.5						IIIB,W
			CULG	0442	0442.5	1							IIIG
			CULG	0458	0459.5	2							IIIG
			CULG	0503.5	0505	2							IIIG
			CULG	0507	0507.5	2							IIIG
			CULG	0516.5	0517.5	1							IIIG
			CULG				0517	0517.5					IIIG,W
			CULG	0624.5	0626	2							IIIG
			CULG	0652.5	0653	1							IIIG
	0740	1446	WEIS				0828.7	0828.8	1				IIIG
			WEIS				0903.8	0906.3	2				IIIG
			WEIS				0914.4	0914.6	1				IIIG
			WEIS				0958.2	1006.0	2				IIIG
			WEIS				1000.4	1002.2	2				II HARM.
			WEIS				1009.2	1016.0	2				II HARM.
			WEIS				1026.6	1026.9	1				IIIG
			WEIS				1149.6	1149.4	2				IIIG
			WEIS				1200.7	1200.9	1				IIIG
	1204	2105	SGMR										
			WEIS				1208.4	1209.8	3				IIIG,RS
			WEIS				1229.5	1235.7	2				IIIGG,RS
			WEIS				1351.4	1351.6	2				IIIG
			WEIS				1354.0	1354.3	3				IIIG
	1400	2340	HARV	1507		3	1507		1				IIIG
			HARV	1632	1635	2							IIIGG
			HARV	1708		3	1708		2				IIIGG
			HARV	1810		2							IIIG
			HARV	1817	1819	3							IIIGG
			HARV	1942	1943	2							IIIG
			HARV				1943	2003	3	1954	2003	3	II
			HARV				2009	2012	2	2009	2012	2	II
	2024	2400	CULG				2023	2140	1				IIIS
			CULG				2024	2122	2				IS,C
			CULG	2034	2035.5	2	2033.5	2036	3				IIIGG
			HARV				2034	2036	3	2034	2036	3	IIIGG
			CULG	2141	2219	1	2122	2212	1				IS
	2209	2335	MANI										
			CULG	2343	2346	3	2343	2346.5	3				IIIGG,U
			CULG	2345.5	2347	2	2345.5	2400	2				II, H
			CULG							2345	2400	1	S.W.F.
	2347	2400	MANI										
08	0000	0900	MANI										
	0000	0710	CULG							0000	0030	1	S.W.F.
			CULG	0000	0257								IN,W
			CULG				0000	0033	1				II
			CULG	0014	0014.5	2							FAST DRIFT
			CULG				0202	0203	3				IIIG,V
			CULG				0204						IIIB,W
			CULG				0205.5						IIIG,W
			CULG				0207	0208	1				IIIG
			CULG				0233						IIIB,W
			CULG	0257	0710								IS,W

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DEC 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
08			CULG				0655	0700					IIIN,W
	0741	1446	WEIS				0908.8	0909.9	2				IIIG
			WEIS				0912.8	0913.2	1				IIIG
			WEIS				0915.4	0916.2	1				IIIG
			WEIS				0919.3	0919.5	2				IIIG
			WEIS				1013.0	1209.0	1				IN
			WEIS				1046.4	1046.5	1				IIIB
			WEIS				1048.9	1051.5	2				IIIG
	1205	2105	SGMR										
			WEIS				1323.6	1323.7	1				IIIG
			WEIS				1418.1	1418.2	1				IIIG
	1400	2340	HARV				1657		2				IIIB
	2024	2400	CULG				2025	2245					IIIN,W
			CULG	2056	2400								IN,W
			CULG				2124.5		1				IIIB
			CULG				2147.5		1				IIIB
	2210	2400	MANI										
			CULG				2245	2336	1				IIIS
			CULG				2307		2				IIIB
			CULG				2311	2400	1				IS
			CULG				2336	2400					IIIN,W
09			CULG				0000	0101					IIIN,W
	0000	0723	CULG				0000	0022	1				IS
			CULG	0000	0116								IN,W
	0000	0900	MANI										
			CULG				0101	0126					IIIS,W
			CULG	0112.5	0113								F D,W
			CULG	0116	0250								IS,W
			CULG				0126	0246					IIIN,W
			CULG				0246	0653	1				IIIS
			CULG				0246	0445	2				IS
			CULG	0305	0305.5	1							FAST DRIFT
			CULG				0310.5	0311	2				IIIB
			CULG				0357	0402	2				IIIS
			CULG	0358	0723								IS,W
			CULG				0445	0519	1				IS
			CULG	0522	0522.5	2							FAST DRIFT
			CULG				0523		1				IIIB
			CULG				0532.5		1				IIIB
			CULG				0642	0659	1				IS
	0743	0846	WEIS				0750.3	0750.6	1				IIIG
			WEIS				0812.7	0813.1	1				IIIG
			WEIS				0819.8	0821.1	1				IIIG
			WEIS				0823.7	0825.2	1				IIIG
			WEIS				0828.3	0830.5	2				IIIG
	0955	1446	WEIS				1038.0	1038.4	2				IIIB
			WEIS				1040.0	1043.5	3				IIIG
	1206	2105	SGMR										
			WEIS				1334.4	1337.3	3				IIIG
			WEIS				1348.4	1348.7	1				IIIG
	1400	2340	HARV				1639	1640	3	1639	1640	3	U
			HARV				1955		2	1955		3	IIIB
	2026	2400	CULG	2026	2400	1	2026	2054	1				IS
			CULG				2027	2227					IIIS,W
			CULG				2033.5		1				IIIB
			HARV				2033		2	2033		2	IIIB
			HARV	2052		1	2052		2				IIIG
			CULG	2052	2052.5	2	2052	2052.5	3				IIIG
			CULG				2054	2142					IS,W
			CULG				2118		2				IIIB
			CULG	2118	2120	2							IIIGG
			HARV				2118		2				IIIG
			CULG				2113.5		1				IIIB
			HARV	2120		2							IIIB
			CULG				2142	2247	1				IS
			CULG	2144.5	2145	2	2145	2145.5	2				IIIGG
			HARV	2145		2	2145		2				IIIG
	2200	2400	MANI										
			CULG	2204		2	2204		2				IIIB

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DEC 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
09			CULG				2227	2400	1				IIIS
			CULG				2228.5		3	2228.5	2229	2	IIIB
			CULG				2236.5	2237	3	2236.5	2237	2	IIIG
			CULG				2238.5		1	2238.5		1	IIIB
			CULG				2239		2	2239		2	IIIB
			CULG				2247	2400	2				IS,DC
10	0000	0724	CULG				0000	0222	2				IS,DC
			CULG				0000	0515	1				IIIS
			CULG	0000	0724	1							IS
	0000	0900	MANI										
			CULG				0132.5		2				IIIB
			CULG	0135.5	0136.5	2							FAST DRIFT
			CULG				0137	0138	2				IIIG
			CULG				0141.5		2				IIIB
			CULG							0209	0230	1	S.W.F.
			CULG	0217	0217.5	1	0213.5	0221	2	0217	0220	2	IIIGG
			CULG				0222	0311	1				IS
			CULG				0255.5	0256.5	2				IIIG
			CULG	0308	0416	2							IS
			CULG				0311	0409	1				IS,DC
			CULG	0345	0345.5	2	0345	0345.5	2				IIIG
			CULG	0354	0354.5	1							IIIG
			CULG				0409	0534	1				IS
			CULG				0413.5	0414	2	0413.5	0414	1	IIIG
			CULG	0426		2	0426		2				IIIB
			CULG				0515	0528	2	0517	0528	2	IIIS
			CULG	0519.5	0520	2	0519.5	0520	3				IIIG
			CULG	0532	0533	2	0532	0532.5	2				IIIG
			CULG				0532	0654	1				IIIS
			CULG				0534	0724	1				IS,DC
			CULG				0558.5	0559	3	0558.5		1	IIIB
			CULG				0650.5		2				IIIB
			WEIS				0749.0	1446.0	2				IS,DC,CONT
	0944	1446	WEIS				0745.0	1446.0	2				IIIS
			WEIS				1045.2	1047.3	2				IIIGG
	1400	2340	HARV				1556	1614	1	1556	1614	1	IIIN
			HARV				1615	1619	2	1615	1619	2	IIIGG
			HARV				1615	1633	1				IN
			HARV				1640	2139	2	1640	2139	2	IIIN
			HARV				1648	1922	2				IN
			HARV				1653	1658	2				IIIGG
			HARV	1749		2							IIIG
			HARV				1819	1820	2	1819	1820	2	IIIGG
	1207	2105	SGMR				1824.2	1824.9	2				V
			HARV	1824	1825	1	1824	1826	3	1824	1826	3	IIIGG
			HARV				1922	2216	1				IN
			HARV	1947	1948	2							IIIG
			HARV				1949	2000	2	1949	2000	2	IIIS
			CULG				2025	2226	1				IS,C
	2025	2400	CULG				2025	2101	1				IIIS
			CULG	2025	2210	1							IS
			CULG	2046.5	2047	1							IIIG
			CULG	2059	2059.5	1							IIIG
			CULG				2101	2400	2	2101	2400	2	IIIS
			CULG				2101	2101.5	3				IIIB
			HARV				2101	2104	3	2101	2104	3	IIIGG
			CULG				2103.5	2104	2	2103.5	2104	2	IIIG
			CULG							2105	2110	1	IIIS
			CULG				2110	2110.5	1				IIIG,U
			CULG				2124.5	2126.5	3	2124.5	2126.5	3	IIIG
			HARV				2125	2126	3	2125	2126	3	IIIGG
	2200	2400	MANI										
			CULG	2210	2400	2	2226	2400	1				IS
			CULG	2333.5	2342	2							FAST DRIFT
			CULG	2333.5	2400	2	2342	2400	3				IV
			CULG				2338	2340	1				UNCLF,POII
			CULG				2345.5	2400	1	2354	2354.5	2	II
			CULG							2345	2400	1	S.W.F.
11	0000	0725	CULG							0000	0030	1	S.W.F.

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DEC 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
11			CULG	0000	0335	1	0000	0248	1				IS
			CULG				0000	0725	1	0000	0518.5	1	IIIS
			CULG	0000	0040	2	0000	0210	2				IV
			CULG				0000	0002.5	1				II
	0000	0900	MANI										
			CULG				0006.5	0007	3				IIIB
			CULG	0207.5	0208.5	2							FAST DRIFT
			CULG				0248	0458	1				IS,DC
			CULG	0335	0725	2							IS,C
			CULG				0458	0725	2				IS,C,DC
			CULG				0522.5		3				IIIB
			WEIS				0749	1445	3				IS,DC,CONT
	0746	1445	WEIS				0749	1445	2				IIIS,DP
	1400	2340	HARV				1405	2340	1				IN,W
			HARV				1607	1940	1	1607	1940	1	IIIN
			HARV				1721		2	1721		2	IIIG
			HARV				1822		2	1822		2	IIIB
			HARV	1941	1944	2							IVF
			HARV				1942	2002	3	1942	2002	3	IIIS
			HARV	1944	1953	2							IVN
	1208	2105	SGMR				1952.8	2007.4	1				IIIG
			HARV	1953	2117	3	1953	2117	3	2004	2117	3	IV
			HARV				2006	2007	3				UNCL
			CULG				2025	2400	2				IS
	2025	2400	CULG	2025	2125	2	2025	2125	2				CONT.
			CULG	2058.5	2109	1							P
			CULG				2114	2400	1				IIIS
			HARV	2117	2136	2	2117	2136	2				IV
			CULG	2125	2400	1	2125	2400	1				CONT.
			HARV				2151	2116	2				IN
	2207	2400	MANI										
			CULG	2240	2400								IS,W
12			CULG				0000	0213	1				IIIS
			CULG				0000	0424	1				IS,DC
			CULG	0000	0420								IS,W
	0000	0725	CULG	0000	0440	1	0000	0440	1				CONT.
			CULG				0007.5		1	0007.5		1	IIIB
			CULG							0134.5	0156	1	S.W.F.
			CULG				0213	0725					IIIS,W
			CULG				0342	0345	3	0342	0345	2	IIIGG
	0000	0900	MANI							0343.2-	0345.0	1	IIIG
			CULG				0345	0350	2				IIIG
			CULG				0347	0348	1				RS,DP
			CULG	0420	0725	1							IS,C
			CULG				0424	0725	2				IS,C,DC
			CULG	0440	0725	2	0440	0725	2				CONT.
			CULG				0608	0725	1				N,DP
	0746	0752	WEIS				0751.0	1445.0	3				IS,DC,CONT
	0756	1445	WEIS				0758.0	1445.0	2				IIIN
			WEIS	0813.4	0813.5	2							IIIB
			WEIS				1100.9	1101.3	2				IIIG
	1209	2105	SGMR										
			WEIS				1334.1	1334.4	2				IIIG
	1400	2340	HARV				1400	2340	1				IN
	0855	1447	OMIN	1402.3	1402.9	1							IIIG
			HARV				1501	1628	1				IIIN
			HARV				1629	2251	2	1727	2038	2	IIIN
			HARV				1830	1832	3	1830	1832	3	IIIGG
			CULG				202E	2400	2				IIIS
	2026	2400	CULG	2026	2400	1	202E	2303	2				IS,C
			CULG				2035.5	2039.5	2				IIIGG
			HARV				203E	2038	2	2036	2038	2	IIIGG
			CULG				2041	2303	1				N,RS,DP
			CULG				2141	2141.5	3	2141	2141.5	2	IIIG
	2209	2400	MANI										
			CULG				2303	2400	2				IS,C,DC
			CULG				2306.5	2307	2	2307		1	IIIG
			CULG				2306.5	2308	2				DC
			HARV				2307		2				I

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DEC 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
12			CULG							2309.5	2323	1	S.W.F.
			CULG				2309		2	2309		2	IIIB
13			CULG				0000	0612	1				IIIS
	0000	0725	CULG	0000	0725	1	0000	0031	2				IS
			CULG				0013.5		3	0013.5		2	IIIB
			CULG							0013	0130	1	S.W.F.
			CULG				0031	0405	1				IS
			CULG				0104.5	0106	3	0104.5	0106	2	IIIG
			CULG				0106.5		2	0107		2	IIIB
			CULG				0108		1	0108		2	IIIB
			CULG				0111.5		2				IIIB
			CULG				0113	0114	2				IIIG
			CULG				0113	0122.5	2				UNCLF,POII
	0000	0900	MANI							0118.8-	0121.5	1	IIIG
			CULG				0118	0123	3	0118.5	0122.5	1	IIIGG
			CULG							0121.5	0122	2	IIIB
			CULG				0220	0220.5	2	0220	0220.5	2	IIIG
			CULG							0357	0540	1	S.W.F.
			CULG				0405	0725	1				IS,DC
			CULG				0408		2	0408		2	IIIB
			CULG				0435.5	0457	2				II
			CULG	0444	0725	2	0455	0541	1				IV
			CULG				0522	0522.5	3	0522	0522.5	1	IIIG
			CULG				0557	0557.5	3	0557	0557.5	2	IIIB
			CULG				0612.5	0613	3				IIIG
			CULG				0612	0725	2				IIIS
			CULG							0619	0700	1	S.W.F.
			CULG				0659.5		3	0659.5		2	IIIB
			WEIS				0752.0	1441.0	2				IS,DC
	0748	1445	WEIS				0756.0	1438.0	2				IIIS
			WEIS				0905.6	0908.1	3				IIIGG
	0808	1520	DWIN	0905.6	0906.2	2							IIIG
	1209	2105	SGMR										
	1400	2340	HARV				1400	2208	1				IN
			WEIS				1431.8	1432.3	2				IIIG
			DWIN	1431.8	1432.5	2							IIIG
			HARV	1432	1433	2							IIIG
			HARV				1525		2	1525		2	IIIG
			HARV				1740	1755	2	1740	1755	2	IIIN
			HARV				2020	2021	2	2020	2021	2	IIIG
	2030	2400	CULG	2027	2400	1	2027	2400	1				IS
			CULG				2027	2056	2				IIIN
			CULG	2027	2144	1	2027	2400	1				IIIS
			HARV				2028	2058	2				I
			HARV	2104	2106	2							I
			HARV	2106	2144	1							INW
			HARV				2142		2	2142		2	IIIG
			CULG				2142	2142.5	2	2142.5	2143	2	IIIG
	2213	2400	MANI										
			CULG							2355	2400	1	S.W.F.
14			CULG	0000	0725	1	0000	0626	1				IS
	0000	0725	CULG							0000	0025	1	S.W.F.
			CULG				0000	0602	1				IIIS
	0000	0900	MANI										
			CULG	0011.5	0012	2	0011.5	0013	2				IIIGG,U
			CULG				0044.5	0046	2	0044.5	0045.5	3	IIIGG
			CULG				0436.5	0453	1				II
			CULG				0602	0725					IIIN,W
			CULG				0603	0604	1				IIIG
			CULG	0616.5		1	0616.5	0617	1				IIIG
			CULG				0626	0725	1				IN
			CULG	0651	0652.5	1							DC
			CULG				0720.5	0721.5	2				IIIG,U
	0856	1040	DWIN										
	1114	1448	DWIN										
	1210	2105	SGMR										
	1400	2340	HARV				1545		2				IIIG
			HARV				1819	1820	1	1819	1820		IIIG

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DEC 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
14			CULG				2027	2400					IN,W
	2027	2400	CULG				2027	2400					IIIN,W
			CULG	2027	2400								IS,W
			CULG	2042	2050	1	2027	2400	1				IIIN
			CULG				2052		2				IIIB
			HARV				2052		2	2052		3	IIIG
			HARV				2121	2122	2	2121	2122	2	IIIG
			CULG	2122.5	2123	1	2121	2123.5	1				IIIGG
	2207	2400	MANI										
			CULG				2233		2				IIIB
			HARV				2233		1				IIIG
			CULG	2334	2336.5	1	2334	2335.5	1				IIIGG
			CULG	2339	2339.5	1	2339	2339.5	1				IIIGG
			CULG				2346		2				IIIB,U
			CULG	2359.5	2400	1	2359.5	2400	2				IIIG,U
15	0000	0725	CULG				0000	0725					IIIN,W
			CULG	0000	0725								IS,W
			CULG				0000	0725	1				IIIN
			CULG				0001		2				IIIB
			CULG				0021	0330					IN,W
			CULG	0041	0042	1	0041	0042	2	0041	0042	2	IIIG
			CULG	0105	0108	1							IIIG
			CULG	0109.5		1	0109.5		1				IIIG
			CULG				0216.5	0219.5	2	0217.5	0219.5	2	IIIGG,V
			CULG	0217.5	0220	1							P
			CULG				0220	0222.5	2	0220	0222.5	2	IIIGG
			CULG	0324.5	0326	1	0324.5	0326	2	0324.5	0326	2	IIIGG
	0000	0905	MANI							0324.8-	0325.4	1	III
			CULG				0330	0725	1				IS
			CULG	0359.5		1	0359.5		2	0359.5		1	IIIB
			MANI							0359.6-	0359.8	1	III
			CULG				0359	0400	1	0359	0400	1	IIIG
			CULG	0508	0509	1	0508	0509	1				IIIG
			CULG	0510	0511	1	0510	0511	1				IIIG
			CULG				0516		2				IIIB
			CULG				0541.5		2				IIIB
			CULG				0543	0544	2				IIIG
			CULG				0608.5		2	0608.5		1	IIIB
			MANI							0705.0-	0706.1	1	III
			CULG				0705.5	0706.5	3	0705.5	0706	1	IIIGG,U
	0743	1445	WEIS				0749.0	1419.0	1				IIIN
			WEIS				0752.0	1445.0	1				IN
	1415	2340	HARV				1528	2058	2	1528	2058	2	IIIN
			HARV				1701	1702	2	1701	1702	2	IIIG
	1211	2106	SGMR				1840.4	1840.8	1				IIIG
			HARV				1840		3	1840		3	IIIG
			SGMR				1950.6	1951.3	1				IIIG
			HARV				1950	1951	3	1950	1951	3	IIIG,V
			HARV				2003	2005	3	2003	2005	3	IIIG
			CULG				2028	2304	1				IIIN
			CULG				2028	2342					IIIN,W
	2028	2400	CULG	2028	2130	1	2028	2116	1				IS
			CULG				2033.5		1				IIIB,U
			CULG				2058	2058.5	1				IIIG
			CULG	2130	2400								IN,W
	2212	2400	MANI										
			CULG	2220.5		1	2220	2221	2	2220	2221	3	IIIG,V
			HARV				2220		3	2220			IIIG
16	0000	0901	MANI										
	0000	0727	CULG				0017	0726					IIIN,W
			CULG	0035	0129								IN,W
			CULG				0055		1	0055		1	IIIB,U
			CULG	0129	0600	1	0317	0630	1				IS
			CULG				0308		2	0308		2	IIIB,V
			CULG	0403	0404.5	1	0403	0404.5	1				IIIG
			CULG				0406		1				IIIB,U
			CULG				0526.5	0527.5	1				IIIG
			CULG	0600	0715		0630	0715					IN,W

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DEC 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
16			CULG				0628	0628.5	1				IIIG
			CULG				0704.5	0708.5	1				IIIGG
			CULG				0705.5	0706.5	2				IIIG
			CULG	0705	0708.5								IIIGG,W
			CULG	0718.5	0719	1	0718.5	0719	2	0718.5		1	IIIG,V
	0751	1445	WEIS				0827.0	1443.0	2				IIIN
			WEIS				0832.0	1443.0	1				IN
	1212	2106	SGMR										
	1415	2340	HARV				1644		1	1644		1	IIIB
			HARV	1720		1							IIIB
			HARV				1752		2	1752		2	IIIG
			CULG				2028	2400	1				IIIN
			CULG				2028	2400					IIIN,W
	2028	2400	CULG	2028	2400	1	2028	2400	1				IS
			CULG	2038	2039	2							IIIG
			HARV				2039		1				IW
			CULG	2119	2123.5	1							IIIG
			HARV				2123		1				IW
			CULG				2139.5		2	2139.5		1	IIIB
			HARV				2139		1				IIIB
	2213	2400	MANI										
17	0000	0900	MANI										
			CULG				0000	0727					IIIN,W
	0000	0727	CULG	0000	0416		0000	0235					IS,W
			CULG				0000	0235	1				IIIN
			CULG				0235	0640	1				IS,DC
			CULG				0235	0330	1				IIIS
			CULG	0257	0258	1	0257	0300	1	0257	0257.5	1	IIIGG
			CULG				0257	0259	2				IIIG
			CULG	0311	0312.5	1	0311	0312.5	1				IIIG
			CULG				0330	0727	1				IIIN
			CULG				0339	0339.5	2	0339	0339.5	1	IIIG
			CULG	0541	0543	1							FAST DRIFT
			CULG	0657	0658.5	1							I
			CULG	0710.5	0712	1							IIIG
	0750	1248	WEIS				0829.7	0829.8	1				IIIB
			WEIS				0950.3	0950.7	1				IIIB
			WEIS				1042.2	1042.6	3				IIIG
			WEIS				1233.6	1234.2	2				IIIG
	1212	2106	SGMR				1447.7	1453.0	2				IIIG
	1415	2340	HARV				1448	1455	2	1448	1455	2	I
	2029	2400	CULG	2029	2400	1	2029	2400	1				IS
			CULG				2032	2400					IIIN,W
			CULG				2107	2340	1				IIIN
	2214	2400	MANI										
18	0000	0908	MANI										
			CULG	0000	0727		0310	0727					IS,W
	0000	0727	CULG				0000	0310	1				IS
			CULG				0000	0719					IIIN,W
			CULG				0006	0643	1				IIIN
			CULG				0259	0259.5	1				IIIG,U
	1401	1446	WEIS				1410.0	1427.0	1				I
			WEIS				1444.9	1445.6	2				IIIG
	1415	2340	HARV				1635	1637	3	1635	1637	3	UNCL
	1213	2107	SGMR				1636.3	1636.7	2				IIIG
	2029	2400	CULG	2029	2400	1	2029	2400	1				IS
			CULG				2046	2400	1				IIIN
			CULG				2305.5	2308	2	2306	2308	2	IIIG,V,U
			CULG				2323.5	2325.5	2	2324.5	2325	1	IIIG,V,U
			CULG	2347.5	2350	2	2346.5	2350	2	2346.5	2350	2	IIIGG,V,U
	2206	2400	MANI							2348.0-	2348.7	1	III
			CULG				2348	2350	2				UNCLF
			CULG							2350	2400	1	S.W.F.
			CULG	2351	2353	1	2351	2400	2				II, H
			CULG				2351		1				IIIB
19			CULG				0000	0556	1				IIIN
			CULG				0000	0657					IIIN,W

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DEC 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
19			CULG	0000	0728	1	0000	0728	1				IS
	0000	0728	CULG				0000	0009	2	0001	0002	1	II, H
	0000	0900	MANI										
			CULG	0419		1	0419		1	0419		1	IIIB
	0753	1446	WEIS				0800.0	1438.0	1				IS
			WEIS				1035.4	1035.7	2				IIIU
			WEIS				1129.9	1129.3	2				IIIG
			WEIS				1136.0	1136.1	1				IIIU
	1214	2107	SGMR										
			WEIS				1319.5	1320.2	2				IIIG
	1415	2340	HARV				1452		1				IIIB
	2030	2400	CULG	2030	2400		2058	2350					IS,W
			CULG				2033.5	2034	1				IIIG
			CULG				2058	2400					IIIN,W
	2213	2400	MANI										
20	0000	0900	MANI										
	0000	0729	CULG	0000	0200								IS,W
			CULG				0009	0729					IIIN,W
			CULG	0010	0010.5	1	0010	0010.5	1				IIIG
			CULG				0026		1				IIIB
			CULG				0059	0101	1				IIIG
			CULG	0200	0330	1	0451	0729	1				IS
			CULG				0204.5		1				IIIB
			CULG				0210		2				IIIB
			CULG				0211	0211.5	1				IIIG,U
			CULG				0217	0217.5	1				IIIG
			CULG	0220.5	0222.5	1							IIIG
			CULG				0227.5		1				IIIB,U
			CULG	0245	0246	1							IIIG
			CULG	0330	0720								IS,W
			CULG				0512.5	0514	1				IIIGG
			CULG	0512	0514	1							IIIGG
			CULG	0515	0515.5	1	0515	0515.5	1				IIIG
			CULG	0524	0725	1							FAST DRIFT
			CULG				0615		1				IIIB
			CULG				0619		1				IIIB
			CULG	0642.5	0645	2	0642.5	0645	2				IIIGG
			CULG	0642	0653.5	1							IIIG
			CULG	0645.5	0647	2	0645	0656	2				II
			CULG				0714	0715.5	1				IIIG
			CULG				0727	0728.5	1				IIIG
	0753	1446	WEIS				0806.2	0806.4	1				IIIG
			WEIS				0811.7	0812.8	1				IIIG
			WEIS				0816.4	0817.3					IIIG,DP
			WEIS				1046.5	1049.6	2				IIIG
			WEIS				1144.7	1149.5	1				IIIG
			WEIS	1211.4	1214.7	1							IIIG
	1214	2107	SGMR										
			WEIS				1245.5	1252.0	3				IIIGG,RS
			WEIS				1254.3	1254.7	2				IIIG
			WEIS				1257.8	1257.9	1				IIIB
	1415	2340	HARV	1544	1545	2							IIIG
			HARV				1726	2100	2	1726	2100	2	IIIN
			HARV				1903		3				IIIB
			HARV				1909		3				IIIB
			HARV				1914	1918	3				I
			HARV				1949	2100	2				I
	2030	2400	CULG	2030	2400	1	2030	2400	2				IS,C,DC
			CULG				2030	2400	1				IIIN
			CULG				2030	2400	1				IIIS
	2215	2400	MANI										
			CULG				2351.5	2352	2	2351.5	2352	1	IIIG
21	0000	0729	CULG	0000	0729	1	0000	0215	2				IS,C,DC
			CULG				0000	0729	1				IIIN
			CULG				0000	0729					IIIS,W
	0000	0900	MANI										
			CULG				0135.5		1				RS,DP
			CULG				0215	0330	2				IS,DC

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DEC 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
21			CULG				0318.5		1				RS,DP
			CULG				0330	0729	1				IS,DC
			CULG				0352.5		2				IIIB
			CULG				0445.5		2				RS,DP
			WEIS				0801.0	1412.0	1				I
	0753	1100	WEIS				0816.4	0816.5	1				IIIB
	1105	1447	WEIS				1046.2	1048.5	2				IIIGG
			WEIS				1119.5	1119.8	1				IIIG
	1215	2108	SGMR										
			WEIS				1225.3	1225.4	1				IIIB
			WEIS				1405.4	1405.7	1				IIIG
	1415	2340	HARV				1634		2	1634		2	IIIB
			CULG	2031	2400								IS,W
	2031	2400	CULG				2031	2400	1				IS
			CULG				2031	2400	1				IIIN
			CULG				2031	2400	1				N,RS,DP
			CULG				2031	2400					IIIS,W
	2116	2400	MANI										
22	0000	0901	MANI										
	0000	0730	CULG				0000	0514	1				IIIN
			CULG	0000	0551								IS,W
			CULG				0000	0730	1				IS,DC
			CULG				0038.5		1	0038.5		2	IIIB
			CULG	0045	0046	1							IIIG
			CULG	0102.5	0103	1							IIIG
			CULG	0117.5	0119	1							FAST DRIFT
			CULG	0505	0505.5	2	0505	0505.5	2				IIIG,U
			CULG				0719	0719.5	1				IIIG,U
	0754	1448	WEIS				0809.0	1226.0	1				IS,DC
			WEIS				0836.0	0836.5	2				IIIG,U
			WEIS				0958.6	0958.7	1				IIIG
			WEIS				1114.6	1114.8	1				IIIG
			WEIS				1151.8	1151.9	1				IIIB
	1215	2108	SGMR										
			WEIS				1242.8	1242.9	1				IIIB
			WEIS				1407.3	1408.7	2				IIIG
			WEIS				1423.4	1423.6	2				IIIG
			WEIS				1433.0	1439.3	2				IIIGG
	1415	2340	HARV				1648		3				IIIG,V
			CULG				2030	2400					IIIS,W
	2030	2400	CULG				2030	2400	1				IS
	2206	2400	MANI										
			CULG				2242.5	2244	2				IIIG,U
			CULG				2247		2				IIIB
			CULG				2306.5		1				IIIB
			CULG				2318		2				IIIB,U
			CULG				2321		2				IIIB,U
			CULG				2343		1				IIIB
23			CULG				0000	0508	1				IIIN
			CULG				0000	0508					IIIS,W
	0000	0508	CULG				0000	0508	1				IS
	0000	0905	MANI										
			CULG				0022		2				IIIB,U
			CULG				0429.5	0430	2				IIIG,U
			CULG				0451		2				IIIB,U
	0530	0730	CULG				0530	0730					IS,W
			CULG				0616.5		2				IIIB,U
			CULG				0626		2				IIIB
			CULG				0639.5	0641	2				IIIG,U
			CULG				0643		2				IIIB
			CULG				0719.5	0720.5	1				IIIG
			CULG				0724.5		2				IIIB
	0756	1448	WEIS				0822.0	1401.0	1				IIIN
			WEIS				1137.4	1137.8	1				IIIG
			WEIS				1200.6	1200.7	1				IIIB
			WEIS				1218.7	1218.8	1				IIIB
			WEIS				1248.9	1249.9	2				IIIG
			WEIS				1323.4	1326.3	2				IIIG

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				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
23			WEIS				1356.8	1357.9	2				IIIG,U
			WEIS				1413.8	1414.9	2				IIIG
			WEIS				1428.5	1430.1	2				IIIG,U
	1415	2340	HARV				1516		1				IIIB
			HARV				1550		2				IIIG
			HARV	1731	1732	2	1731	1734	3	1731	1734	2	IIIGG,V
	1216	2109	SGHR				1734.9	1735.8	1				IIIG
			HARV				1734	1737	3				UNCL
			HARV				1934	2301	2	2001	2225	2	IIIN
			HARV				2001		3	2001		3	IIIG
			HARV	2028	2029	2	2028	2029	3	2028	2029	3	IIIGG
			HARV				2030	2032	1				UNCL
			CULG				2032.5	2110					IIIGN,W
	2032	2400	CULG				2032	2400	1				IS
			CULG				2034.5	2035	2				IIIB
			CULG				2036.5	2037	2				IIIB
			CULG				2041	2041.5	1				IIIB
			CULG				2043	2043.5	1				IIIB
			CULG	2044	2044.5	1	2044	2046	2				IIIG,V
			HARV				2044	2046	3	2044	2046	3	IIIG
			CULG				2057	2102.5	3	2100.5	2110	2	IIIGG,V
			HARV				2100	2102	3	2101	2102	3	IIIGG,V
			CULG	2125	2156	1							IS
			CULG				2139.5	2141.5	3	2139.5	2140.5	1	IIIG,V,U
			HARV				2139	2142	3	2139	2142	2	IIIG
			CULG	2141.5	2142	1							FAST DRIFT
			CULG				2141.5	2143	3	2141.5	2142	3	IIIGG,V,U
			CULG	2143.5	2144	1							FAST DRIFT
			CULG				2143.5	2147	2	2144	2144.5	1	IIIG,U
			CULG				2147.5	2149	3	2148	2148.5	3	IIIGG,V,U
			HARV				2148		3	2148		2	IIIG
			CULG				2153	2356	1				IIIGN
			CULG				2224.5	2226	3				IIIG,V
			CULG	2224.5	2227	1	2224.5	2228	2				IIIGG,V
			CULG	2228.5	2229.5	1							FAST DRIFT
			CULG				2231	2231.5	2				IIIB
			CULG	2238.5	2239.5	1	2238.5	2240	1				IIIG
			CULG	2300.5	2301	2	2300.5	2302	3	2301	2302	3	IIIG,V
			HARV	2301		2	2301		2				IIIG
			CULG				2307	2308	2	2307	2307.5	1	IIIG
	2310	2400	MANI										
			CULG				2312	2315.5	2	2313	2315.5	1	IIIGN
24	0000	0730	CULG				0005	0006	2	0005	0006	2	IIIG
			CULG	0006.5	0007	1	0006.5	0007.5	2	0007	0007.5	2	IIIGG,U
	0000	0903	MANI							0008.3-	0010.4	1	IIIG
			CULG							0008.5	0023	1	S.W.F.
			CULG	0008	0010.5	1	0008	0011	3	0008	0010.5	3	IIIGG,V,U
			CULG				0029.5	0721					IIIGN,W
			CULG				0123		1				IIIB
			CULG				0137	0139	1				IIIG
			CULG							0138.5	0139		IIIG,W
			CULG	0211	0211.5	1	0209.5	0212	1	0209.5	0212	2	IIIG
			CULG	0214	0214.5	2	0214	0217	3	0214	0216.5	2	IIIGG,V,U
			MANI							0215.2-	0216.0	1	III
			CULG				0231.5	0232	2	0231.5	0232	1	IIIG
			CULG				0241	0241.5	2				IIIG
			CULG				0256		1	0256		1	IIIB
			CULG				0257.5		1	0257.5		1	IIIB
			CULG				0259.5		1	0259.5		1	IIIB
			CULG	0310	0329	1							IS
			CULG	0512	0521	1							IIIGN
			CULG				0518	0519.5	1				IIIG,U
	0755	1014	WEIS				0838.0	0854.6	2				IIIGG
	1108	1449	WEIS				0905.7	0906.6	2				IIIG
			WEIS				1136.9	1137.5	3				IIIG
			WEIS				1204.0	1207.1	3				IIIG
	1216	2110	SGHR										
			WEIS				1234.4	1234.5	2				IIIB
			WEIS				1247.7	1247.9	1				IIIG

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				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
24			WEIS				1250.0	1250.1	1				IIIG
			WEIS				1419.0	1419.1	1				IIIB
	1415	2340	HARV				1604	1605	3	1604	1605	3	IIIG
			HARV				1610	1611	1	1610	1611	1	IIIG
			HARV				1756		3	1756		3	IIIG
	2031	2400	CULG	2036.5	2037	1							IIG
			CULG				2051.5	2052					IIIG,W
			CULG				2117	2146	1				IS
			CULG	2121	2352								IN,W
			CULG				213E	2137.5					IIIG,W
			CULG	2148	2148.5	1							IIIG
			CULG				2210.5						IIIG,W
	2218	2400	MANI										
			CULG				2225	2237	1	2229	2230	1	IIIGN
			CULG				2336	2336.5	2	2336	2336.5	1	IIIB,U
			CULG				2343.5		2	2343.5		1	IIIB
			CULG				2345.5						IIIB,W
			CULG	2352	2400	2							IS
25	0000	0429	CULG	0000	0144	2							IS,DC
	0000	0902	MANI										
			CULG				0017						IIIB,W
			CULG				0027	0029					IIIGG,W
			CULG	0144	0403	1							IS
			CULG				0401	0401.5	1				IIIG
	0442	0611	CULG				0518.5						IIIB,W
			CULG				0542	0542.5	1				UNCLF
			CULG				0543.5		1				IIIB
			CULG				0601.5		1				UNCLF,RS
			CULG				0601.5	0602.5	2				IIIG
			CULG	0605.5		1	0604.5	0606.5	3				IIIG
			CULG	0606.5	0607	2							IIIG
			CULG				0607.5	0609	1				IIIG
	0715	0750	CULG				0744.5	0745					IIIG,W
			CULG				0747	0747.5	2				IIIG
	0746	1450	WEIS				0800.0	1449.0	2				IS
			WEIS				0936.3	0937.6	2				IIIG
			WEIS				0946.8	0946.9	1				IIIB
			WEIS				1211.8	1212.0	2				IIIB
	1217	2110	SGMR										
			WEIS				1230.5	1232.3	2				IIIG
	1415	2340	HARV				1733	2254	2	1733	2137	2	IIIN
	2005	2304	CULG				2007	2008					IIIG,W
			HARV				2008	2011	3	2008	2011	3	IIIG
			CULG				2010	2011	1				IIIG
			CULG				2114	2304	1				IIIGN
	2224	2400	MANI										
26	0000	0904	MANI										
	0105	0726	CULG				0110	0134					IIIS,W
			CULG				0113	0114.5	2	0111	0114.5	2	IIIG
			CULG				0120.5			0120.5			IIIB,W
			CULG	0121	0122	1							IIIG
			CULG	0151	0230	1							IS
			CULG	0157.5	0158	1	0154	0200	2	0154.5	0155	1	IIIGG
			CULG				0254	0536					IIIN,W
			CULG	0314	0726	1							IS
			CULG	0320	0324	1							N,RS
			CULG				0340	0341	1				IIIG
			CULG				0355	0501	1				IS
			CULG							0439.5	0440	1	IIIG
			CULG				0439.5	0440.5					IIIG,W
			CULG				0501	0537	1				IS,DC
			CULG				0526.5	0527	1				IIIG
			CULG				0537	0605.5	2				IIIS
			CULG				0537	0556	1				IS
			CULG				0537	0537.5	3	0537	0537.5	2	IIIG
			CULG	0541	0542	1							IIIG
			CULG	0544		1	0546	0546.5	2	0546.5	0547	1	IIIB
			CULG	0545	0550	2							IIIGN

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				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
26			CULG				0549.5	0550	2	0549.5	0550	1	IIIG
			CULG				0602		3				IIIB
	0755	1450	WEIS				0901.5	0901.6	1				IIIB
			WEIS				0924.9	0925.4	1				IIIG
			WEIS				1007.8	1008.7	1				IIIG
			WEIS				1209.9	1210.1	1				IIIB
			WEIS				1217.2	1217.3	1				IIIB
	1217	2111	SGMR										
			WEIS				1404.1	1404.3	2				IIIG
			WEIS				1414.2	1414.3	1				IIIB
	1415	2340	HARV				1820		2	1820		2	IIIG
			HARV	1954		1							IIIG,W
	2033	2400	CULG	2042	2042.5	1							I
			CULG				2122	2234					IIIGN,W
			CULG				2141		1				IIIB
	2225	2400	MANI										
27	0000	0910	MANI										
	0000	0636	CULG	0118	0121	1							I
			CULG				0119.5						IIIB,W
			CULG				0132						IIIB,W
			CULG				0133	0133.5		0133.5	0134		IIIG,W
			CULG				0242	0243					IIIG,W
			CULG	0247	0248	1	0247	0248	2	0247.5	0248.5	2	IIIG
			CULG	0251	0311								IN,W
			CULG	0438.5	0439.5		0438.5	0439					IIIG,W
			CULG				0455						IIIB,W
	0715	0733	CULG										
	0754	1018	WEIS				0950.0	0950.1	1				IIIB
			WEIS				0956.2	0956.6	2				IIIG
	1024	1451	WEIS				1054.4	1054.7	1				IIIG
			WEIS				1129.4	1129.9	2				IIIB
			WEIS				1131.2	1131.3	1				IIIG
			WEIS				1200.9	1201.7	1				IIIG
	1415	2345	HARV	1628	1632	3							IIIGG
			HARV	1632	1642	3							IV
			HARV				1633	1640	3				II
	1217	2111	SGMR				1634.5	1639.2	2				II
			HARV				1643	1649	1				IN
	2033	2400	CULG				2139	2400					IN,W
			CULG				2154	2154.5	3	2154	2154.5	3	IIIG
			HARV				2154		2	2154		2	IIIB
	2220	2400	MANI										
			CULG				2318.5						IIIB,W
			CULG	2335	2400								IS,W
28	0000	0733	CULG	0000	0016								IS,W
	0000	0900	MANI										
			CULG				0010.5	0015.5					IIIGG,W
			CULG				0059.5						IIIB,W
			CULG				0104						IIIB,W
			CULG	0114.5	0146								IS,W
			CULG				0119.5	0121	1				IIIG
			CULG				0119	0124					IIIGG,W
			CULG	0146	0212	1							IS
			CULG				0148	0148.5					IIIG,W
			CULG	0212	0249								IS,W
			CULG	0538	0733	1							IS
			CULG				0613.5						IIIB,W
			CULG				0645	0733	1				IS
			CULG				0713	0714					IIIG,W
	0756	1452	WEIS				1050.7	1050.9	1				IIIB
			WEIS				1155.5	1314.3	1				IN
	1218	2112	SGMR										
	1415	2340	HARV	1554		1							IIIB
			HARV	1614		1							IIIB
			HARV	1742	1743	3							IIIGG
	2130	2400	CULG	2139	2225								IS,W
			CULG				2212	2213					IIIG,W
	2228	2400	MANI										

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				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
28			CULG				2249	2252	1				I
			CULG				2327		2				IIIB
29	0000	0901	MANI										
	0000	0733	CULG				0117	0117.5	2	0117.5	0118	1	IIIG
			CULG				0124						IIIB,W
			CULG				0337.5						IIIB,W
			CULG				0422.5	0423.5					IIIG,W
			CULG				0428.5						IIIB,W
			CULG				0628	0641	1				IIIS
			CULG				0642	0733					IIN ,W
	0756	1453	WEIS				0831.6	0835.3	1				IIIG
			WEIS				1025.2	1028.7	1				IIIG
			WEIS				1035.7	1036.1	1				IIIG
	1218	2113	SGMR										
			WEIS				1414.7	1416.5	2				IIIG
	1415	2340	HARV										
			WEIS				1419.3	1419.4	1				IIIB
	2034	2400	CULG										
			CULG	2129	2236								IS,W
			CULG				2133.5	2135.5	1	2134	2134.5	1	IIIGG
			CULG				2140.5	2143.5					IIIG,W
			CULG				2153	2153.5					IIIG,W
			CULG				2158	2159					IIIG,W
			CULG				2211	2346					IN,W
	2225	2400	MANI										
			CULG				2239	2242					IIIG,W
			CULG				2308	2341	1				IIIS
30	0000	0734	CULG				0106	0106.5					IIIG,W,U
			CULG				0116						IIIB,W
			CULG				0137	0137.5					IIIG,W
			CULG	0143	0215	1							IS
			CULG				0332						IIIB,W
			CULG				0340.5						IIIB,W
			CULG				0432						IIIB,W
			CULG				0440.5						IIIB,W
			CULG	0443			0443	0443.5					IIIG,W
			CULG				0519	0520	1				IIIG
			CULG	0543	0553	1							IIIB
			CULG				0545	0626	3	0608	0614	1	II, H
			CULG	0547	0552	1							IV
			CULG				0552	0552.5	1				IIIB,U
			CULG	0553	0553.5	1							FAST DRIFT
			CULG				0640.5	0641					IIIG,W
			CULG				0725		1				IIIB
			CULG				0727	0728.5	3				IIIG
			CULG				0731	0734	1				II
	0756	0924	WEIS				0852.7	0854.9	3				IIIG
	0109	0908	MANI							0854.0-	0854.5	1	III
			WEIS				0900.8	0900.9	1				IIIG
	1218	2114	SGMR										
	0944	1454	WEIS				1254.2	1258.1	2				IIIG
			WEIS				1258.5	1305.3	2				II
	1415	2340	HARV										
	2034	2400	CULG				2051.5		1				IIIB
	2223	2400	MANI										
			CULG				2240	2240.5					IIIG,W
			CULG				2247.5	2250					IIIGG,W
			CULG	2257.5		1							FAST DRIFT
31	0000	0735	CULG				0022						IIIB,W
			CULG	0037.5		1							IIIB
			CULG	0047									F D,W
	0056	0901	MANI										
			CULG	0108	0735								IN,W
			CULG				0157	0158					IIIG,W
			CULG	0158.5	0159	1							IIIG
			CULG				0235.5						IIIB,W
			CULG				0627	0735					IS,W

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				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
31			CULG				0635.5	0636					IIIG,W
	0756	1454	WEIS				0927.5	0927.6	1				IIIB
			WEIS				1157.2	1158.1	2				IIIG
			WEIS				1236.6	1237.1	2				IIIG,U
			WEIS				1303.4	1306.8	1				IIIG
			WEIS				1355.8	1356.3	1				IIIG
	1218	2115	SGMR				1511.8	1513.6	1				IIIG
			HARV				1513	1514	2	1513	1514	3	UNCL
	1415	2340	HARV				1513		2				IIIB
			HARV	1514		1							IIIG
			HARV				1552	1553	2	1552	1553	3	UNCL
			HARV				1637		2	1637		2	U
			HARV	1805	1807	2							IIIG
			SGMR				1901.9	1902.1	1				III
			HARV	1901		1	1901	1902	3	1901	1902	3	IIIG,V
			HARV	1905	1907	2	1906		2				IIIG
	2035	2400	CULG				2035	2044					IS,W
			CULG				2106.5	2107	2				IIIB
			CULG				2106	2111	1				IIIGG
			CULG				2109.5	2110	1				IIIB
			CULG				2150.5	2151.5					IIIG,W
			CULG				2153	2153.5					IIIG,W
			CULG				2204	2207					RS
	2219	2400	HANI										
			CULG				2222	2400					IIIN,W
			CULG	2323.5	2325.5	1							IIIG
			CULG	2350	2351	1	2350.5		1				IIIG

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III

RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity
DCIM = Fast drift

SELECTED SOLAR EVENTS

DECEMBER 1978

Culgoora

UT Date 1978 December	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
30/1	2300	0500	160	1.0	310	L	1	IS	Type I activity persisted from this region until 2nd.
2	0108		80)	1.0	310		2)	IIIB	
			160)				)		
	0328	0328.5	80)	1.0	285		2)	IIIG,W	*
			160)				)		
	0343	0344.5	160	0.5	20		2	IIIG	*
3	0246	0246.5	80)	1.1	270		2)	IIIG	*
			160)				)		
	0311		80)	0	0		2)	IIIB	*
			160)				1)		
	0327	0327.5	43.25)				5)		
			80)	1.1	70		2)	IIIG	*
			160)				3)		
	2233.5	2234.5	43.25)	1.1	110		2)	IIIG	*
			80)				1)		
4	0127.5	0128	43.25)				)		
			80)	0.8	230		2)	IIIG,U	
			160)				)		
	2233	2235	160	1.0	210		2	IIIG	
5	0016	0026	43.25)				3)		
			80)	0.9	100		3)	IIIGG	
			160)				2)		
7	0125		160	0.6	250		2	IIIB	
	0407	0410	80)	1.1	100		2)	IIIGG	
			160)				1)		
8	0201.5	0203	43.25)	1.3			3)		
			80)	1.2	245		3)	IIIG,V	
			160)	1.1			2)		
8/9	2357	0200	80)	0.2	0	R	2)	IS	Type I activity persisted from this region until 14th.
			160)	0			1)		

Days without Heliograph observations: 26th, 27th, 28th.

* Other type III's observed from same position during the day.

UT Date 1978 December	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
9	0246	0500	43.25)	1.5)			2)		
			80)	1.0)	45	L	2)	IS	Type I activity persisted from this region until 14th.
			160)	0.8)			1)		
10	0213	0221	43.25)	1.5)			3)		
			80)	1.2)	45		)	IIIGG	
			160)	1.0)			)		
	0345	0345.5	43.25)	0.8)			2)		
			80)	1.0)	225		2)	IIIG	*
			160)	1.3)			3)		
10/11	2340	0330	80)		)	See	3)	IV)	Complex source & polarization.
			160)	0.5	135)	remarks	2)	)	
	2345.5	0002.5	80)				)	)	
			160)	0.6	110		3)	II)	
11	0352.5	0353	43.25)	1.4)			3)		
			80)	0.5)	330		3)	IIIG	
			160)	0.2)			3)		
12	0008	0009	43.25)	1.8)	40		3)	IIIG	
			80)	1.0)			3)		
	0210	0345	80)	0.5	130		2)	IS	
			160)				3)		
13	0113	0114	43.25)	1.0	245		3)	IIIG	
			80)				)		
	0113	0122.5	43.25)	1.0	245		3)	UNCLF, POSSIBLE II	
			80)				)		
	0437	0443	80)	0.3	155		2)	II	
			160)				)		
	0443	0500	80)	0.3	155		2)	IV	Complex source structure at 80 MHz
			160)				)		
13/14	2300	0500	80)	1.3)	30	L	2)	IS	Type I activity from this region persisted until 18th.
			160)	0.8)			)		

Days without Heliograph observations: 26th, 27th, 28th

* Other type III's observed from same position during the day.

SELECTED SOLAR EVENTS

DECEMBER 1978

Culgoora

UT Date 197Q December	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
14	0044	0047	43.25)	2.0)			)		
			80)	1.0)	340		3)	IIIGG	*
			160)	0.5)			)		
	0436	0443	80)	)	270		3)	II	
			160)	0.4)	250		2)		
	0446	0448	43.25)	1.5)	15		3)		
			80)	0.5)	345		3)	IIIG	
			160)	0.3)	250		1)		
14/15	2359	0003	43.25	1.5	325		3)		
			80	1.1)	325)		2)		
				1.3)	290)		)	IIIG,U	
			160	1.0)	325)		2)		
				1.2)	290)		)		
16	0308	0309	43.25)	1.5)	315		3)	IIIB,V	*
			160)	1.2)			2)		
17	0257	0300	43.25)	1.7)			)		
			80)	1.3)	20		3)	IIIGG	
			160)	1.0)			)		
18/19	2300	0500	80)	1.1)	0	varying	3)	IS	Type I activity from this region continued until 20th.
			160)	)		0-L	2)		
	2323.5	2326	43.25)	1.4)			3)		
			80)	1.2)	0		2)	IIIG,V,U	*
			160)	1.1)			2)		
	2346	2350	43.25)	1.5)	340		3)		
			80)	1.5)	325		3)	IIIGG,V,U	
			160)	1.0)	325		2)		
	2350	0010	43.25	1.5	320		3	II	
20	0011	0012	160)	0.1	130		2	IIIG	
	0058.5	0101	43.25)	1.3)			3)		
			80)	1.0)	270		3)	IIIG	
			160)	1.0)			2)		
20/21	2356	0520	43.25)				2)		Type I activity from this region continued until 25th at 80,160 MHz
			80)	0.7	45	L	2)	IS	
			160)				3)		

Days without Heliograph observations: ..26th..27th..28th.....

* Other type III's observed from same position during the day.

UT Date 197Q December	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions: Central Dist. ($R_\odot$)	Positions: Position Angle (Deg.)	Polarization	Intensity (1-3)		
23	0022	0023	43.25)	1.7)			2)		
			80)	1.3)	100		3)	IIIB,U	
			160)	1.1)			3)		
24	0009.5	0011	43.25)	1.5)			)		
			80)	1.2)	315		3)	IIIGG,V,U	*
			160)	0.7)			)		
	0138	0140	43.25)	1.7)	85		2)		
			80)	1.5)	90		3)	IIIG	*
			160)	1.1)	110		2)		
	2336	2336.5	43.25)	0.5	315)		3)	IIIB,U	
			80)		)		2)		
29	2327	2328	43.25)	1.5)			3)		
			80)	1.5)	65		2)	IIIG	
			160)	1.1)			1)		

Days without Heliograph observations: 26th, 27th, 28th.

* Other type III's observed from same position during the day.

COSMIC RAY INDICES

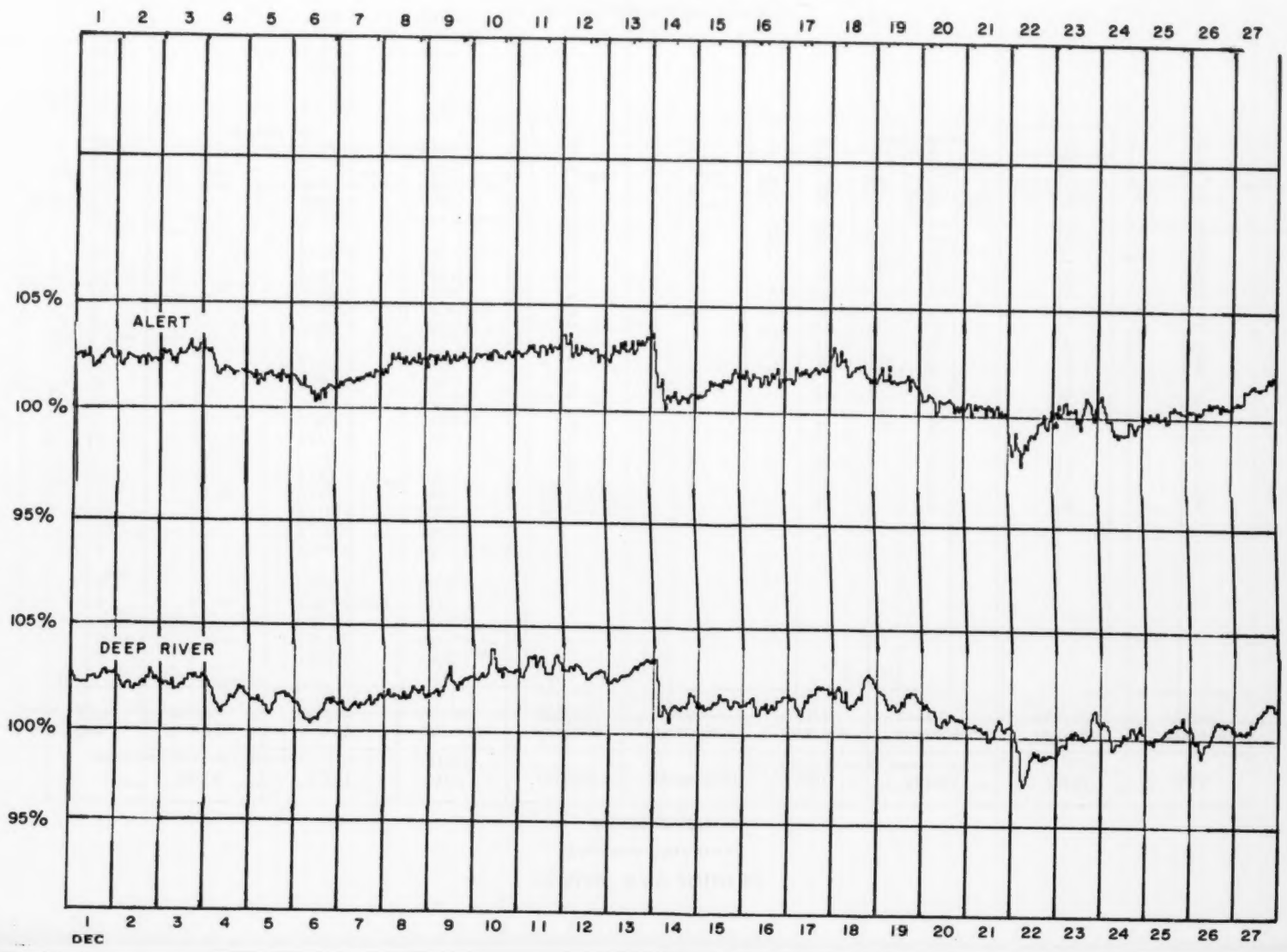
(Neutron Monitors)

DECEMBER 1978

Dec. 1978	THULE Average cts/hr	ALERT Average cts/hr	DEEP RIVER Average cts/hr	CALGARY Average cts/hr	SULPHUR MT. Average cts/hr	KIEL Average cts/hr	CLIMAX Average cts/hr	TOKYO Average cts/hr	KULA Average cts/hr
1	Data not available at time of publication	7333.6	6938.1	Data not available at time of publication	Data not available at time of publication	Data not available at time of publication	Data not available at time of publication	Data not available at time of publication	Data not available at time of publication
2		7324.3	6921.7						
3		7353.4	6924.6						
4		7303.8(22)	6870.4						
5		7257.8	6854.8						
6		7214.9	6818.6						
7		7249.4	6846.2						
8		7318.4	6882.2						
9		7334.1	6920.2						
10		7347.5	6973.7						
11		7372.4	6995.2						
12		7380.4	6970.8						
13		7384.9	6976.5						
14		7227.1	6861.4						
15		7241.7	6856.1						
16		7272.2	6855.8						
17		7294.5	6886.7						
18		7322.8	6905.5						
19		7272.2	6877.8						
20		7186.0	6815.3						
21		7160.5	6771.5						
22		7056.9	6665.7						
23		7154.3	6752.9						
24		7111.0	6757.4						
25		7146.6	6766.6						
26		7175.8	6760.8						
27		7246.4	6816.6						
28		7281.3	6850.4						
29		7252.4	6794.8						
30		7124.5	6682.6						
31		7019.1	6562.3						
MEAN		7249.0	6843.0						

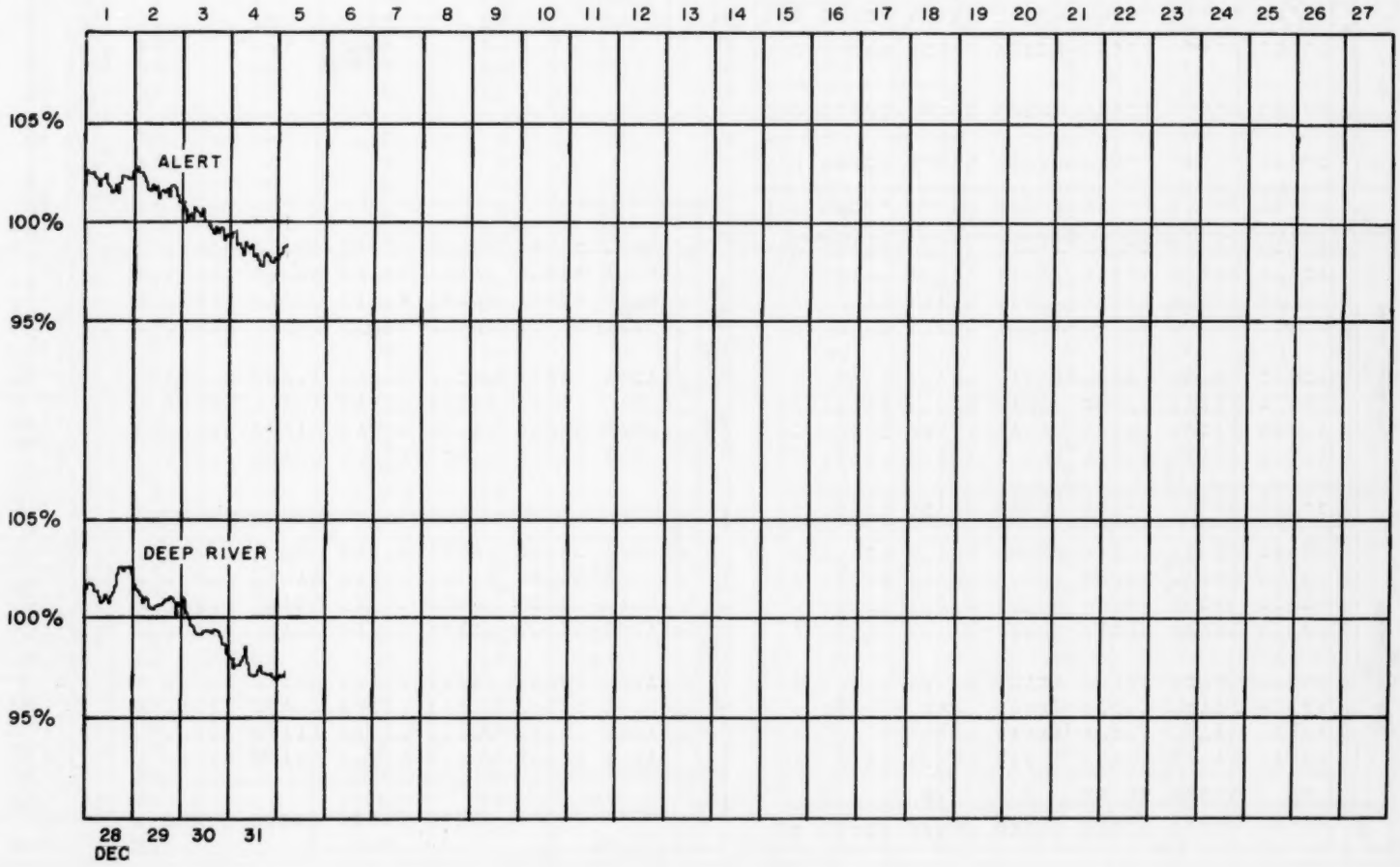
COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1987 (December 1978)



COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1988 (December 1978)



GEOMAGNETIC ACTIVITY INDICES

DECEMBER 1978

Day	Three-Hourly Indices Kp									Three-Hourly Indices Km								Ap	aa *					Cp
		1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8		N	S	M			
1		2-	3+	3+	3	3	2-	1	1	18	2-	3-	3	3	3-	2	2-	2-	11	14	19	22	11		0.6
2	Q5	1+	1-	0+	1-	1-	0+	0+	1+	6-	1	1	1-	1-	1	1-	0+	1+	3	6	6	7	5	CC	0.1
3	Q8	2	2	0	1-	1-	2-	1+	2-	10	1+	1+	0	1-	1	2	2-	2	5	9	7	7	9	CK	0.2
4		2-	2+	2	3+	3	3	3	3-	21	2	2+	2	3+	3-	3	3	3-	12	20	25	20	26		0.7
5		4	3	2-	1	1-	1	2	3+	17-	4-	3-	2-	1+	1-	1+	2+	3	10	17	17	20	15		0.6
6	Q9	2-	1+	1+	1	1	1	2+	1	11-	2-	1+	2-	1+	2-	1+	2+	1+	5	9	10	10	9	CC	0.2
7	Q3	1-	0+	1-	0+	0+	1-	0+	0+	4-	1-	1-	0+	0+	1	1+	1-	1-	2	4	4	3	5	CC	0.0
8	Q6	0	0	1-	2-	1-	1-	2	1	7-	1-	0+	1-	2	1	1-	2+	2-	3	6	6	5	8	CC	0.1
9	Q4	0+	2-	0+	0+	0+	1-	1-	0+	5-	1-	2-	1-	0+	1	1+	1-	0+	3	4	7	7	4	CC	0.0
10	Q1	1-	0	0	0	0+	0+	0	0	1+	1-	0+	0	0+	0+	0+	0+	0+	1	3	4	4	3	CC	0.0
11	Q2	0	0	0	0	0	0	0+	1	1+	0+	0	0	0	1-	0+	1-	1+	1	3	5	2	5	CC	0.0
12	Q7	0	0	0	2-	2-	1+	2-	2	8+	0+	0+	0	2-	3-	2+	2+	2+	4	8	11	4	15	CC	0.1
13		3+	3+	1+	1-	0+	0	1	2-	12-	3	2	1+	1-	1-	0+	1+	2	7	12	10	16	6	K	0.4
14	Q5	4	5	6-	4+	4-	2+	2	2+	29+	5-	5-	5+	4	3+	3-	2+	3-	28	36	86	100	22		1.2
15	Q3	4-	6+	4+	3+	4-	3+	2+	3-	30-	4-	5-	3+	3	3+	3	3-	3	28	29	47	47	29		1.2
16		2+	3+	2	3-	3-	3	4-	3	23-	2+	3	2	3-	3-	3	4-	3	14	24	27	19	33		0.8
17		3	2+	2+	1+	2	1	2	3+	17+	3	2-	2	1	2+	1	2+	3+	9	12	19	14	18		0.5
18	Q1	4+	4-	5+	5+	6-	6-	5	4+	39+	4+	4-	5-	5-	5	5+	5-	4	48	74	69	60	84		1.6
19		4-	4+	3+	3	5-	4	4	3	30	3	3+	3-	3-	5-	4-	4-	3-	24	41	36	29	48		1.2
20	Q4	4-	4-	3+	4	4	4+	4+	4	31+	3+	3-	3-	4	4-	4	4-	4-	26	45	35	29	51		1.2
21		3+	4-	3	3-	3-	2+	2-	1+	21-	2+	3-	2+	3	3-	2+	2-	1+	12	19	16	21	15		0.7
22		3-	4+	3	4	3	4	3-	2+	26	2+	4-	3+	4	3+	4	3-	2+	19	32	37	37	32		1.0
23		3	2+	2+	1	1	2+	1+	0+	14-	2+	2-	2	1+	1+	3-	2-	1-	7	12	11	13	10	C	0.4
24	Q0	1	1+	3-	2	1	1	1	1	11	1+	1+	2	2	2-	2-	1	1	6	9	10	10	9	CC	0.2
25		3-	3-	3	3	6-	4+	2	1+	25-	2+	2+	3-	3-	6-	4+	2+	2	21	29	32	20	42		1.1
26		2+	2+	3	2+	2	2-	2-	2-	17	2	1+	3-	3-	2	2-	2	2+	8	15	13	16	13		0.5
27		4+	4	2	1	3-	3	2+	1+	21-	3+	3	2-	1	3-	3-	3-	1+	14	25	14	21	19		0.8
28		2-	3	1	0+	2	4+	5-	2+	19+	1+	2+	1+	1-	2	4	4+	3-	14	31	18	10	40		0.8
29		3-	3-	1+	2	2+	5	5-	4	25-	3-	2	2-	2+	2+	5	4+	4-	20	38	30	17	51		1.0
30	Q2	4	5	4-	4-	3	3-	5-	4+	31	3+	4	3+	3	3	3-	4+	3+	27	47	43	46	43		1.2
31		5-	4-	3	3+	3-	3	3-	3-	26-	4-	3	3-	3-	3-	3-	3	3-	18	27	24	29	23		1.0
																			13	21.3	22.5	22.1			0.63

Day	Three-Hourly Indices Kn								Three-Hourly Indices Ks							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1	1+	2+	3	3	2+	2	1+	1+	2	3-	3-	3+	3-	2	2-	2
2	1-	1-	1-	1-	1-	1-	0	1	1	1	1	1-	1	0+	0+	1+
3	1+	1+	0	1-	1-	2	1+	2-	2-	1+	0+	1-	1+	2	2	2+
4	2	2+	2-	3	3-	3-	3	2+	2	3-	3-	4-	3	3+	3	3
5	3+	3-	2-	1	0+	1	2-	3-	4-	3-	2-	2	1	1+	3-	3
6	1+	1	1+	1	1	1	2+	1	2-	2-	2	2	2	2-	2+	1+
7	1-	0+	0+	0+	1-	1	1-	0+	1-	1	1-	1-	1+	1+	1-	1
8	0	0	1-	2-	1-	1-	2	1	1+	1-	1-	2+	1+	1-	3-	2
9	0	1+	1-	0	1	1+	0+	0	1	2	1	1-	1+	1+	1	0+
10	0+	0	0	0	0	0+	0+	0	1-	0+	0	1-	1-	1-	0+	0+
11	0	0	0	0	1-	0	0+	1	0+	0	0	0	1	1-	1-	2
12	0	0	0	1+	2+	2	2	2	1	0+	0+	2-	3	3-	3-	3-
13	3-	2	1+	0+	0+	0+	1	1+	3+	2	2-	1-	1-	1-	2-	3-
14	4	4	5-	4	4-	2+	2	2+	5+	5-	6-	4	3+	3-	3-	3-
15	3+	5	4-	3	3+	3-	2+	2+	4+	5-	3-	3	3	3	3-	4-
16	2-	3	2	3-	3-	3	4	2+	3-	3	2	2+	3-	3+	3+	3+
17	2+	2	2	1-	2+	1+	2	3	4-	2-	2+	1	3-	1	2+	4-
18	4-	3	5-	5-	5	5	4+	4	5	4-	4+	5-	5+	6-	5	4-
19	3	4-	2+	3	5-	4-	4-	3-	3	3-	3-	3-	5-	4-	3+	3-
20	3+	3-	3-	4	4-	4	4-	4-	3	3-	3-	4	4-	4	4-	3+
21	2+	3-	3-	3	3-	2+	2-	1	2+	2+	2-	3-	3-	2	2-	2-
22	2+	4-	3	4-	3-	4-	3-	2+	3-	4-	3+	4	4-	4	3-	2+
23	3-	2-	2+	1+	2-	3-	1	0	2+	1+	1+	1+	1+	3-	2	1+
24	1+	2-	2+	2	2-	2-	1-	1	2-	1	2-	2-	2-	2-	1	1
25	2+	2	3+	3-	6-	4	2	1+	3-	2+	2	3-	6-	5-	2+	2+
26	2-	2-	3	3-	2+	2	2	2-	2	1+	3-	3-	2	1+	2+	3-
27	4-	3	2-	1	3-	3	3	1	3	3-	1+	1	3-	3-	2+	2-
28	1+	3-	1	0+	1+	4+	4-	2+	1	2+	1+	1-	2+	4-	5-	3
29	2+	2	1+	2	2+	5-	4	3+	3-	2	2	3-	2+	6-	4+	4-
30	3	4	3	3	3	3-	4	3	4-	4	3+	3-	3	3	4+	4-
31	4-	3	3-	3-	3	3-	3	3-	4-	3-	3-	3-	3-	3-	3-	2+

Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2γ) prepared by Geophysikalisches Institut at the University of Göttingen, F.R. of Germany for the International Service of Geomagnetic Indices. Ten most quiet days [Q1-Q0(10)] and five most disturbed days [D1-D5] are ordered from most quiet or disturbed, respectively. A or K means "not really quiet" (A = "Ap>6", K = "Ap ≤6 but one Kp ≥3o or two Kp values ≥3-"). An * means "not really disturbed" (Ap<20).

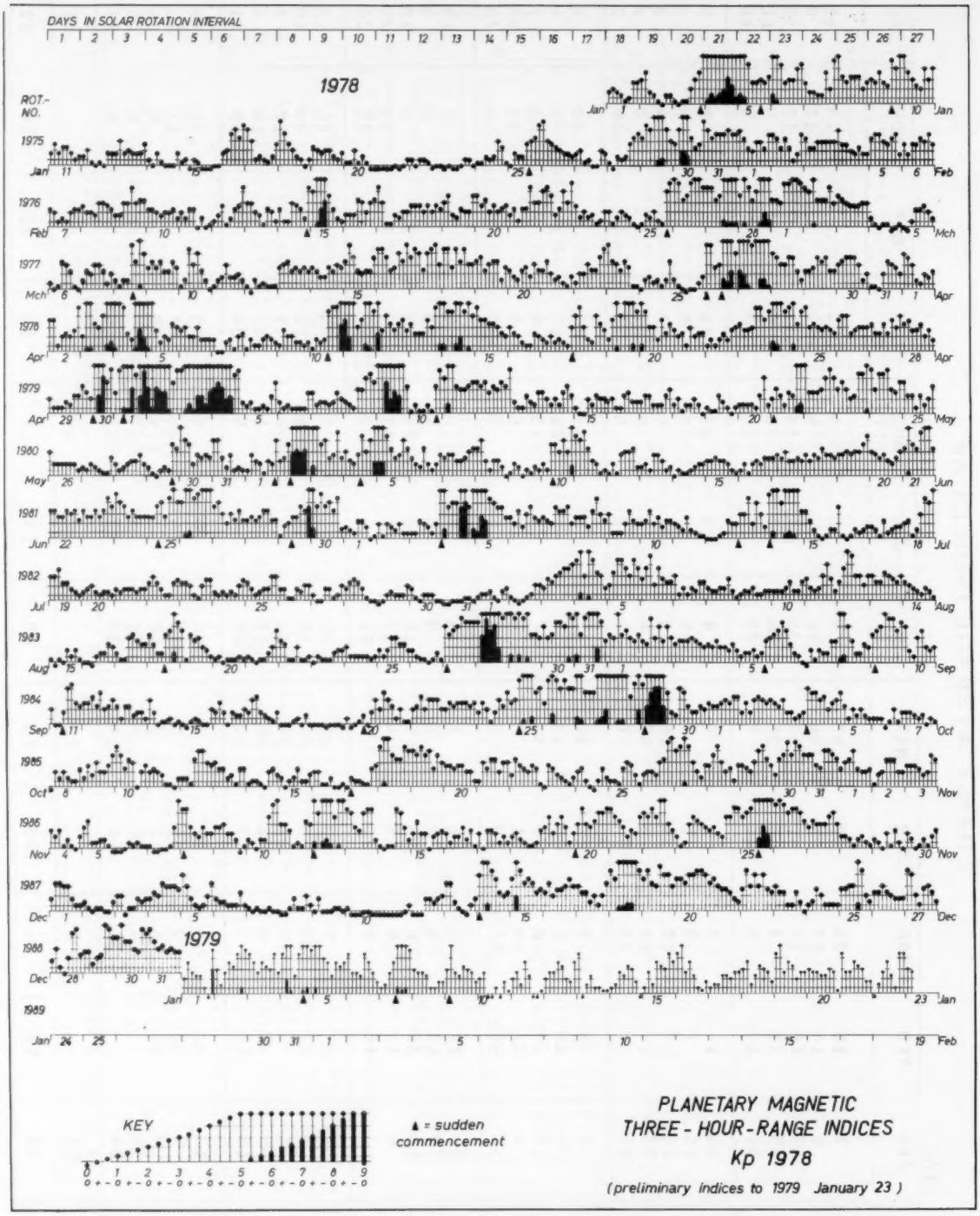
Geomagnetic three-hourly indices (Kn), (Ks) and (Km) as in IAGA-Bulletin No. 32 and indices (aa), "antipodal", as in IAGA-Bulletin No. 33 prepared by P. N. Mayaud of the Institut de Physique du Globe, Paris, France. Really quiet (C) and quiet but slightly disturbed three-hourly intervals (K) are given for 24-hour and 48-hour intervals centered on 12 UT.

DAILY AVERAGE INDICES Ap

1978

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	7	15	33	12	88	9	6	4	21	13	13	11
2	8	14	27	15	94	82	5	4	20	12	10	3
3	13	14	15	41	83	31	11	16	11	8	12	5
4	89	11	3	55	96	26	80	30	8	17	5	12
5	31	17	6	21	7	38	53	22	7	8	6	10
6	34	14	7	9	5	8	13	16	14	4	2	5
7	13	7	9	5	7	11	14	7	6	4	9	2
8	19	10	20	5	16	10	14	6	24	5	14	3
9	23	16	14	6	85	4	8	5	31	11	8	3
10	21	7	12	36	10	24	10	6	12	15	16	1
11	7	5	7	64	30	17	6	11	12	5	10	1
12	4	10	3	29	18	10	4	21	13	14	53	4
13	8	8	12	24	11	7	20	13	6	8	22	7
14	3	11	10	51	9	4	48	6	5	5	11	28
15	2	48	17	19	5	6	6	3	3	5	8	28
16	14	11	24	8	7	6	6	4	6	4	6	14
17	9	10	25	7	8	9	6	9	8	5	6	9
18	12	10	24	19	5	11	18	24	3	32	5	48
19	6	12	15	38	4	17	11	11	2	22	13	24
20	3	12	9	23	8	11	5	3	5	9	22	26
21	1	12	7	9	26	33	6	6	9	13	16	12
22	3	22	13	8	24	15	8	6	12	10	28	19
23	2	6	15	22	24	18	8	4	11	6	12	7
24	6	5	6	48	26	19	6	4	10	5	18	6
25	12	12	3	17	10	24	8	9	36	7	60	21
26	12	37	49	18	7	46	5	4	36	18	33	8
27	5	42	70	16	5	15	4	29	51	23	17	14
28	9	46	17	12	7	12	6	124	50	14	5	14
29	36		14	6	8	32	4	40	109	16	4	20
30	36		16	58	18	31	3	31	11	25	5	27
31	23		8		12		2	45		20		18
MEAN	15	16	16	23	25	20	13	17	18	12	15	13

GEOMAGNETIC ACTIVITY INDICES



R9	Rot.-No.	1st day	C9
222 322 22	19	D31	42 266 676 66 456 533 23 3 43 246
12 22	75	J27	43 246 533 424 2366666 656 443 222 645 23
1 12 22	1937	F23	645 23 533 265 2 776 665 644 34 36 246
1 1 1	38	M22	34 246 652 32 22 466 766 665 2 6 546
11 223	39	A18	6 546 422 4 546 654 45 64 245
11 11	40	M15	64 245 332 45 3 5 633 33 464 236
11 23 222	41	J11	464 234 333 653 3 6643 5
233 322 223	42	J8	6664 5 443 442 6533 6 44
665 322 11	43	A4	6 44 45 44 32 64
222 22 22	44	A31	3 566 543 42 4 42
11 12 211	45	S27	42 32 667 662 322 23
1 22 223	46	D24	23 252 677 533 665 4 2 257 246
21 22 1	1947	N20	257 244 6 2 666 633 2 542 24 23
1 1 1	19	D17	23 2 5 664 43 4 334 3 774 23 342
22 11	76	J13	23 342 235 655 3 12 665 632 256 663 455
11 1 1	1951	F9	663 455 2 4 565 44 656 566 346 676 666
12 252 332	52	M7	676 666 344 554 32 6443 284 766 664
21 222 222	53	A3	766 664 433 234 2 5 42 334 32 784
22 122 211	54	A30	32 784 222 3 2 35 334 2 45 42
1 1 222	55	M27	45 42 35 523 2 62 45 45 2
21 1 1	56	J23	45 2 65 234 12 43 54 2
1 11 223	57	J20	2 24 552 222 3 21 2
22 1 12 12	58	A16	66 653 3 35 342 222 23 23
21 11 222	59	S12	3 2 3 657 543 53 3 3 245 4 3 2 422
122 222 21	1960	D9	2 422 666 522 21 21 463 25
1 12 21	19	N5	25 566 42 2 2 3 22 4 3
12 232 122	77	D2	4 3 543 342 2 362 2 2 733 4
222 12 23	1964	D29	733 4 343 43 53 3 23 2 446
1 1 212 44 2	65	J25	2 446 525 3 2 455 634 233 2 4 25 432
1 1 2 1	66	M20	33 433 424 4 3 637 765 442 33 422 763
32 1 12 223	67	A16	422 763 3 5 5 474 533 255 24 553
22 1 12 333	68	M13	24 553 2 2 2 2 224 12 2 2
22 1 235 533	69	J9	2 12 22 333 33 21 3 243 22 644 442
22 1 12 32	1970	J6	644 442 25 364 256 33 7 42 2 654
222 333 323	71	A2	2 654 353 633 332 636 2 36 342 12
322 244 443	72	A29	12 12 23 35 632 22 777 753 355 2
453 443 444	73	S25	355 2 12 222 36 445 235 6 5 7
333 422 224	1974	D22	5 77 22 32 2 567 642
42 24 454	19	N18	45 3 3 7 245 6542 23
332 345 652	77	D15	23 7663 555 2 2 4
222 335 778	78	J11	2 4 23 3 3 2 665 444 344 34 23
765 445 666	1978	F7	34 2 3 237 323 333 5 3677664 22 543
665 556 545	79	M6	22 543 33 466 542 244 77 44 423 477 522
567 757 776	80	A2	477 52 6765752 56 522 574 544 777 878
565 456 655	81	M26	77 878 2 2 473 653 2 2 2 66 563 253
676 434 577	82	J22	253 276 662 32 642 23 436 455 674
887 446 776	83	J19	455 674 366 3 773 442 2 57 5 3 22
532 334 556	84	A15	3 22 2 465 42 3 53 2 53
433 446 887	85	S11	2 53 2 686 675 532 24 563 33
888 888 775	86	D8	33 2 23 336 677 836 324 34 42
788 887 777	87	N4	34 42 65 232 2 554 465 333 242
777 565 577	88	D1	242 437 532 354 635 764 3 33
778 888 546	89	J28	3 33 266 427 663 52 524 456 5
8		J24	56 576 467 4 2 422 442 353 44 preliminary

Symbol	.	1	2	3	4	5	6	7	8	9
R̄ =	0	1-15	16-30	31-45	46-60	61-80	81-100	101-130	131-170	171...
R9,C9 =	0	1	2	3	4	5	6	7	8	9
Cp =	a.0-a.1	a.2-a.3	a.4-a.5	a.6-a.7	a.8-a.9	1.0-1.1	1.2-1.4	1.5-1.8	1.9	2.0-2.5

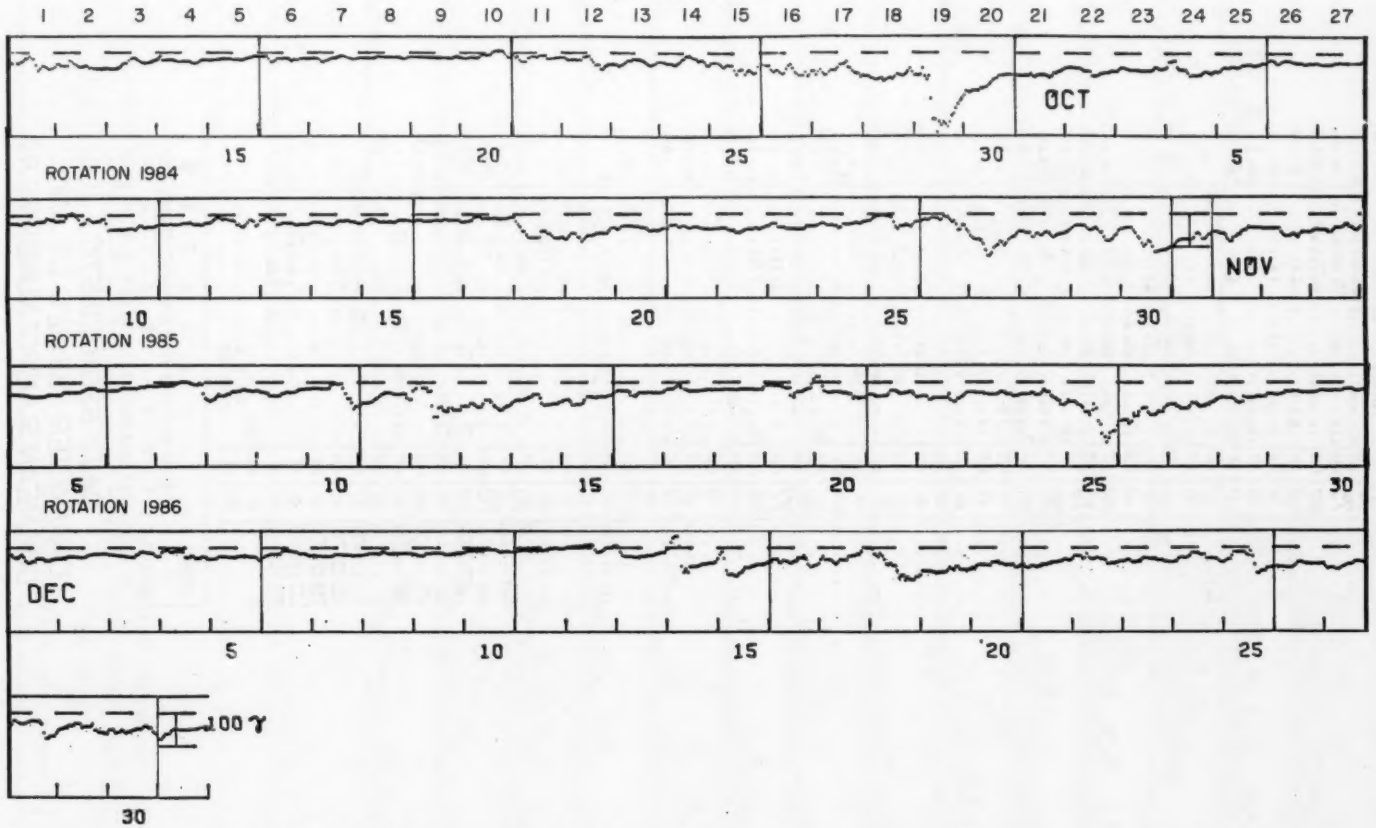
DAILY GEOMAGNETIC CHARACTER FIGURES C9 AND 3-DAY MEAN SUNSPOT NUMBERS R9

For explanation and previous years see J. Bartels, Abhandlungen der Akademie der Wissenschaften zu Göttingen, Beiträge zum I.G.J., Heft 3 (1958) (may be requested from Institut für Geophysik, Postfach 876, 34 Göttingen, Germany).

GEOMAGNETIC ACTIVITY INDICES

Hourly Equatorial Dst

by Bartels Rotation



Note: Both the sensitivity indicator placed on the last day of the month and the zero reference level change from month to month.

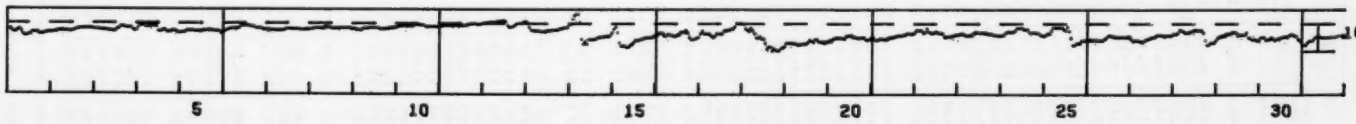
HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

NASA/GODDARD SPACE FLIGHT CENTER

DECEMBER 1978

(Time-UT) (Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-24	-23	-30	-34	-34	-27	-22	-31	-41	-47	-45	-42	-40	-34	-35	-34	-35	-40	-41	-39	-36	-35	-33	-34
2	-34	-32	-31	-29	-27	-28	-27	-30	-30	-31	-32	-30	-27	-23	-21	-20	-19	-19	-19	-19	-18	-19	-20	-23
3	-23	-24	-25	-26	-27	-26	-25	-25	-30	-31	-31	-30	-23	-19	-13	-14	-15	-17	-18	-16	-19	-25	-29	-25
4	-15	-10	-8	-6	-13	-15	-12	-11	-11	-7	-13	-31	-30	-29	-25	-27	-33	-33	-31	-27	-29	-31	-36	-36
5	-34	-33	-33	-27	-28	-28	-27	-30	-31	-31	-29	-28	-26	-26	-25	-24	-26	-29	-30	-28	-28	-33	-38	-31
6	-28	-25	-23	-20	-18	-20	-18	-20	-17	-11	-10	-9	-11	-11	-13	-13	-15	-19	-18	-19	-20	-24	-25	-24
7	-23	-25	-27	-25	-28	-28	-26	-27	-25	-24	-20	-19	-20	-22	-23	-21	-21	-23	-25	-23	-22	-22	-22	-21
8	-20	-19	-16	-17	-18	-19	-18	-17	-13	-11	-16	-19	-18	-17	-16	-17	-17	-16	-16	-17	-17	-19	-16	-21
9	-20	-24	-26	-25	-23	-17	-19	-19	-15	-16	-16	-16	-17	-17	-21	-22	-21	-20	-17	-16	-14	-14	-15	-14
10	-12	-10	-9	-9	-8	-11	-11	-9	-7	-6	-5	-5	-7	-7	-8	-11	-14	-12	-13	-12	-11	-14	-13	-12
11	-11	-9	-8	-8	-9	-10	-10	-8	-9	-8	-8	-10	-8	-8	-6	-3	-2	-1	0	-2	-5	-2	-2	0
12	2	3	4	5	4	5	6	6	9	7	8	11	5	-7	-14	-14	-11	-7	-1	1	-2	-2	6	6
13	1	-15	-23	-28	-26	-26	-26	-30	-31	-28	-27	-25	-25	-24	-23	-22	-22	-21	-18	-17	-14	-15	-13	-6
14	-2	15	27	33	33	2	-57	-75	-64	-73	-57	-56	-58	-56	-54	-51	-48	-47	-50	-46	-45	-46	-42	-34
15	-20	-13	-34	-69	-80	-80	-82	-86	-87	-78	-73	-67	-60	-62	-59	-55	-54	-51	-49	-51	-51	-50	-46	-40
16	-43	-35	-36	-37	-44	-43	-38	-39	-42	-46	-45	-40	-38	-31	-30	-30	-24	-34	-52	-58	-56	-53	-51	-47
17	-36	-27	-37	-37	-36	-39	-45	-51	-44	-37	-36	-38	-37	-27	-24	-23	-22	-19	-19	-12	1	-2	-2	-2
18	-4	-21	-23	-28	-17	-25	-36	-51	-50	-46	-54	-53	-69	-91	-83	-85	-97	-88	-94	-97	-94	-87	-86	-80
19	-69	-68	-70	-68	-72	-73	-75	-75	-75	-72	-73	-74	-66	-60	-64	-67	-57	-56	-65	-67	-65	-65	-64	-64
20	-60	-59	-54	-50	-50	-51	-52	-54	-53	-44	-44	-41	-40	-48	-49	-53	-52	-52	-52	-49	-58	-60	-55	-49
21	-51	-58	-62	-57	-53	-56	-59	-59	-54	-49	-51	-50	-46	-44	-42	-42	-41	-39	-38	-35	-34	-38	-38	-32
22	-24	-23	-26	-25	-34	-30	-18	-29	-35	-35	-32	-28	-34	-36	-35	-38	-48	-47	-45	-45	-44	-42	-39	-40
23	-40	-37	-35	-41	-44	-42	-41	-39	-35	-31	-32	-34	-35	-35	-33	-33	-38	-37	-38	-42	-42	-44	-45	-44
24	-41	-38	-32	-29	-32	-33	-29	-25	-17	-15	-17	-17	-22	-23	-23	-33	-33	-32	-35	-34	-37	-41	-45	-46
25	-40	-37	-34	-25	-14	-15	-15	-15	-15	-15	-22	-26	-12	-29	-52	-78	-78	-71	-69	-69	-62	-62	-59	-56
26	-57	-59	-61	-60	-61	-62	-61	-61	-61	-55	-50	-43	-43	-47	-48	-48	-50	-51	-48	-48	-50	-49	-46	-46
27	-56	-63	-60	-62	-61	-65	-65	-62	-58	-55	-52	-49	-49	-47	-42	-40	-40	-44	-45	-45	-44	-45	-43	-38
28	-37	-37	-33	-23	-26	-30	-34	-34	-33	-28	-26	-23	-24	-26	-26	-26	-34	-61	-77	-75	-69	-67	-67	-60
29	-51	-46	-45	-41	-39	-37	-37	-36	-31	-31	-33	-43	-39	-39	-39	-41	-33	-52	-53	-58	-59	-60	-62	-59
30	-50	-49	-49	-60	-56	-59	-50	-55	-61	-55	-54	-51	-49	-47	-45	-50	-43	-38	-38	-45	-46	-56	-62	-68
31	-76	-79	-69	-62	-61	-60	-52	-47	-44	-47	-51	-51	-51	-50	-49	-48	-47	-49	-47	-44	-42	-45	-47	-46



Honolulu Magnetic Observatory, welcome back!! Beginning December 1978 the data from Honolulu are included in the calculation of the Dst index, together with the data from Hermanus, Kakioka, and San Juan. From May to November 1978 the regular magnetometer at Honolulu was not operated; hence the provisional Dst index for this period was based on data from Hermanus, Kakioka, and San Juan only.

PRINCIPAL MAGNETIC STORMS

DECEMBER 1978

OBS. 3 letter IAGA code	GEOMAG-NETIC LATI-TUDE	COMMENCEMENT DAY	hr min (UT)	TYPE	SC - AMPLITUDES D(')	H(y)	Z(y)	MAXIMUM 3 HOUR - INDEX K DAY(3 HOUR PERIOD)	K	RANGES D(')	H(y)	Z(y)	UT END DAY	HOUR
HYB	07.6N	4	0100	..	..	..	..	04(2)	4	2	109	15	05	11
HYB	07.6N	12	1002	SC	- .1	+ 7	- 1	12(5) 13(1,3)	3	3	59	19	13	09
COL	64.6N	14	0127	SC*	+20	+43	+12	14(3) 15(4)	6	143	1030	870	16	04
SIT	60.1N	14	0128	SC*	+ 7.1*	+30.1*	- 5.2*	14(3)	8	--	910	410	17	02
NEW	55.1N	14	0127	SC*	5	30	3	14(3) 15(2)	6	42	168	232	17	10
FRD	49.6N	14	0126	SC	+ 2	+32	- 5	15(2) 18(5)	6	34	156	67	20	11
SJG	29.9N	14	0126	SC	+ .5	+18	+ 4	14(2)	5	8	117	28	15	06
HON	21.1N	14	0127	SC	- 1	+29	+16	14(2,3)	6	5	168	24	15	--
JAI	17.3N	14	0126	SC	- 1.2	30	- 9	--	-	6	136	23	15	23
SHL	14.6N	14	0126	SC	- .4	25	6	--	-	4	155	29	15	23
UJJ	13.5N	14	0126	SC	- 1.1	35	- 9	--	-	5	122	29	15	23
ABG	09.5N	14	0126	SC	- 1.1	29	-11	14(3)	6	7	152	43	15	23
HYB	07.6N	14	0128	SC	- .7	+30	- 3	14(2,3,4)	6	6	164	29	17	03
GUA	04.0N	14	0126	SC*	+ 1	+46	-14	14(3)	6	--	230	30	15	17
ANN	01.4N	14	0126	SC	- 2.3	44	18	--	-	8	282	--	15	23
HUA	00.6S	14	0126	SC	--	51	9	14(2,3,5)	5	--	239	44	15	06
TRD	01.2S	14	0126	SC	- .6	40	42	--	-	6	358	224	15	23
PNG	18.6S	14	0125	SC*	- .4*	+45	+29	14(3)	6	13	210	110	21	14
HER	33.7S	14	0127	SC	+ 4	+36	+28	14(1,2,3,4)	5	32	145	100	17	03
GNA	43.3S	14	0127	SC	- 4.6	+24	-11	14(1,3) 18(1,5)	6	27	180	170	20	17
TOO	46.7S	14	0127	SC	- .7	+27	+ 6	14(3)	7	34	290	100	15	16
KGL	56.5S	14	0127	SC	--	--	--	14(1,2,3) 15(1,2)	5	--	--	--	16	04
NEW	55.1N	17	21--	..	..	..	..	18(3)	6	41	163	239	23	10
IRK	41.0N	17	18--	..	..	..	..	18(5,7)	6	28	157	41	20	23
JAI	17.3N	17	2100	..	..	..	..	--	-	7	188	28	20	23
SHL	14.6N	17	2100	..	..	..	..	--	-	5	193	31	20	23
UJJ	13.5N	17	2100	..	..	..	..	--	-	5	184	28	20	23
ABG	09.5N	17	2100	..	..	..	..	18(6)	6	6	207	30	20	23
HYB	07.6N	17	1250	..	..	..	..	18(5)	7	5	225	31	20	23
GUA	04.0N	17	2052	..	..	..	..	18(5)	5	10	220	30	19	07
ANN	01.4N	17	2100	..	..	..	..	--	-	5	240	67	20	23
HUA	00.6S	17	1258	SC	--	30	2	18(5,6)	6	12	285	50	19	07
TRD	01.2S	17	2100	..	..	..	..	--	-	4	256	143	20	23
HER	33.7S	17	2100	..	..	..	..	18(1,5,7)	5	36	139	123	21	03
TOO	46.7S	17	21--	..	..	..	..	18(3,5,6) 19(5)	5	25	160	40	19	22
KGL	56.5S	17	21--	..	..	..	..	18(6)	8	--	--	--	21	23
COL	64.6N	18	06--	..	..	..	..	18(4,5) 20(4)	7	266	1630	960	21	14
SIT	60.1N	18	04--	..	..	..	..	18(5)	7	100	--	600	22	17
WIT	54.2N	18	23--	..	..	..	..	18(6,7)	6	43	185	75	19	03
HON	21.1N	18	0034	SC	- 1	-25	-10	18(5)	5	4	107	38	19	--
HYB	07.6N	22	0030	..	..	..	..	22(3,6)	4	3	93	21	22	20
HUA	00.6S	22	0042	..	..	..	..	22(5,6)	6	9	199	55	22	24
COL	64.6N	25	08--	..	..	..	..	25(5)	7	284	1550	980	25	21
NEW	55.1N	25	01--	..	..	..	..	25(5)	6	37	176	174	27	20
HON	21.1N	25	1212	SC	- 1	+17	+ 5	25(5,6)	4	4	42	8	27	--
JAI	17.3N	25	1212	SC	- .3	18	- 4	--	-	6	106	24	27	21
SHL	14.6N	25	1212	SC	.4	19	3	--	-	5	105	23	27	21
UJJ	13.5N	25	1212	SC	- .1	24	- 4	--	-	5	111	29	27	21
ABG	09.5N	25	1212	SC	- .3	20	- 3	25(5)	6	4	109	39	27	21
HYB	07.6N	25	0100	..	..	..	..	25(5,6)	6	3	168	29	26	13
ANN	01.4N	25	1212	SC	--	--	--	--	-	--	--	--	27	21
HUA	00.6S	25	1212	SC	1	23	6	25(6)	7	10	299	59	26	01
TRD	01.2S	25	1212	SC	.1	21	28	--	-	4	145	79	27	21
HER	33.7S	25	1212	SC	- 2	+11	+ 9	25(5)	6	25	105	122	26	03
KGL	56.5S	25	1212	SC	--	--	--	25(5)	7	--	--	--	26	14
HYB	07.6N	27	1300	..	..	..	..	28(6)	6	3	127	16	28	23
IRK	41.0N	28	12--	..	..	..	..	29(6)	6	20	145	32	31	22
HUA	00.6S	28	1152	..	..	..	..	29(6)	7	16	395	51	30	24
HER	33.7S	28	1600	..	..	..	..	28(6,7) 29(6)	5	22	91	108	31	24
NEW	55.1N	29	0848	..	..	..	..	30(2)	5	19	119	77	01	07
HON	21.1N	29	1624	SC	- 1	+10	+ 5	29(6,7,8)	3	5	56	24	31	--
HYB	07.6N	29	0100	..	..	..	..	29(6)	5	3	109	26	31	22
TOO	46.7S	29	1624	SC	..	+27	..	29(6) 30(2)	5	22	120	40	31	15
KGL	56.5S	29	03--	..	..	..	..	29(6)	6	--	--	--	01	00
JAI	17.3N	30	1600	..	..	..	..	--	-	3	55	8	31	04
SHL	14.6N	30	1600	..	..	..	..	--	-	4	45	9	31	04
UJJ	13.5N	30	1600	..	..	..	..	--	-	3	62	9	31	04
ABG	09.5N	30	1600	..	..	..	..	30(7)	5	3	63	16	31	04
ANN	01.4N	30	1600	..	..	..	..	--	-	--	--	--	31	04
TRD	01.2S	30	1600	..	..	..	..	--	-	2	72	52	31	04

Reports were received from the following observatories:

ALIBAG ANNAMALAINAGAR COLLEGE FREDERICKSBURG GNANGARA GUAM HERMANUS HONOLULU HUANCAYO HYDERABAD IRKUTSK JAIPUR KERGUELEN NEWPORT PORT MORESBY SAN JUAN SHILLONG SITKA TOOLANGI TRIVANDRUM UJJAIN WITTEVEEN

AMENDMENT TO TABLE: Correction received late from Witteveen -- please change date of principal magnetic storm on 18 December 1978 2300 UT to 17 December 1978 2300 UT.

SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

DECEMBER 1978

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS

The meaning of the station symbols is given in the IAGA-News nr. 16.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc).

14	0127	A:	SOD	DOB	NUR	ESK	DOU	FUR	COI	TOL	FRD	KSA	HAZ	QUE	PMG
			HUA	LMM	KGL	DRV									
		B:	WNG	WIT	HAD	CLF	MMB	AQU	EBR	KAK	KNY	CZT			
		C:	NGK												
18	0036	A:	COI												
		B:	WNG	VIC	CLF	KAK	QUE	(si:	A:	WIT	EBR	;B:	TOL	;C:	NGK
			-pg:	A:	FUR)										
25	1212	A:	COI	QUE	LMM	KGL									
		B:	SOD	VIC	AQU	EBR	TOL	HUA	CZT	DRV					
		C:	CLF												

Solar-flare effects (sfe)

Effects confirmed by ionospheric or solar observations are underlined.

04	0544 - 0550	HAZ			13	0436 - 0440	HAZ
07	2344 - 2358	HAZ			17	0730 - 0740	WIT
09	1100 - 1109	WNG	(b:	A: LMM)	18	0212 - 0230	QUE
12	1007 - 1018	WNG			18	0448 -	CLF
13	0352 - 0358	HAZ					

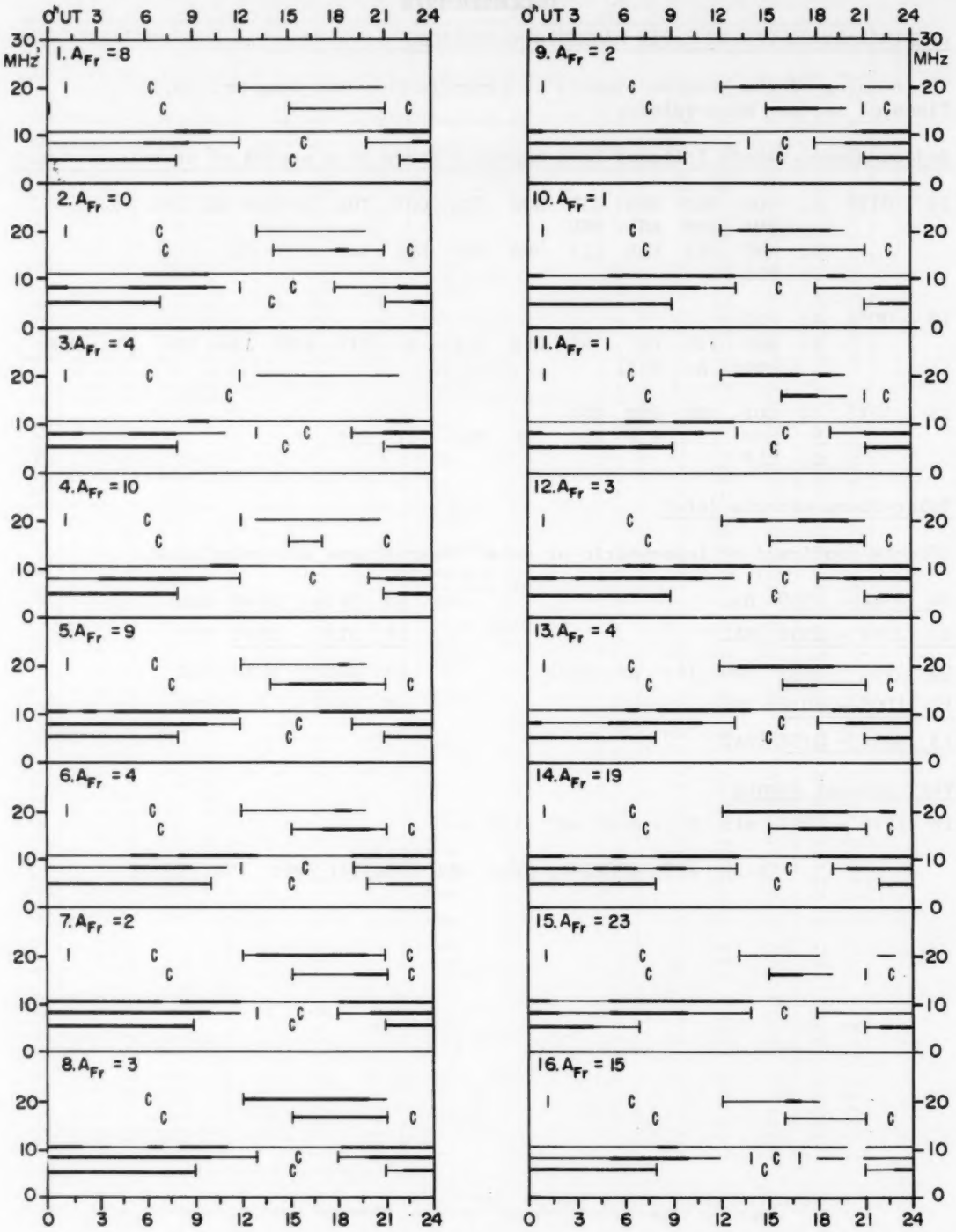
Very unusual events

16 1920 - 1927 si: KGL (-24 -37 -11)

pi1: WIT (70s30); pi½: WNG (60s31); psc: FUR (75 3)

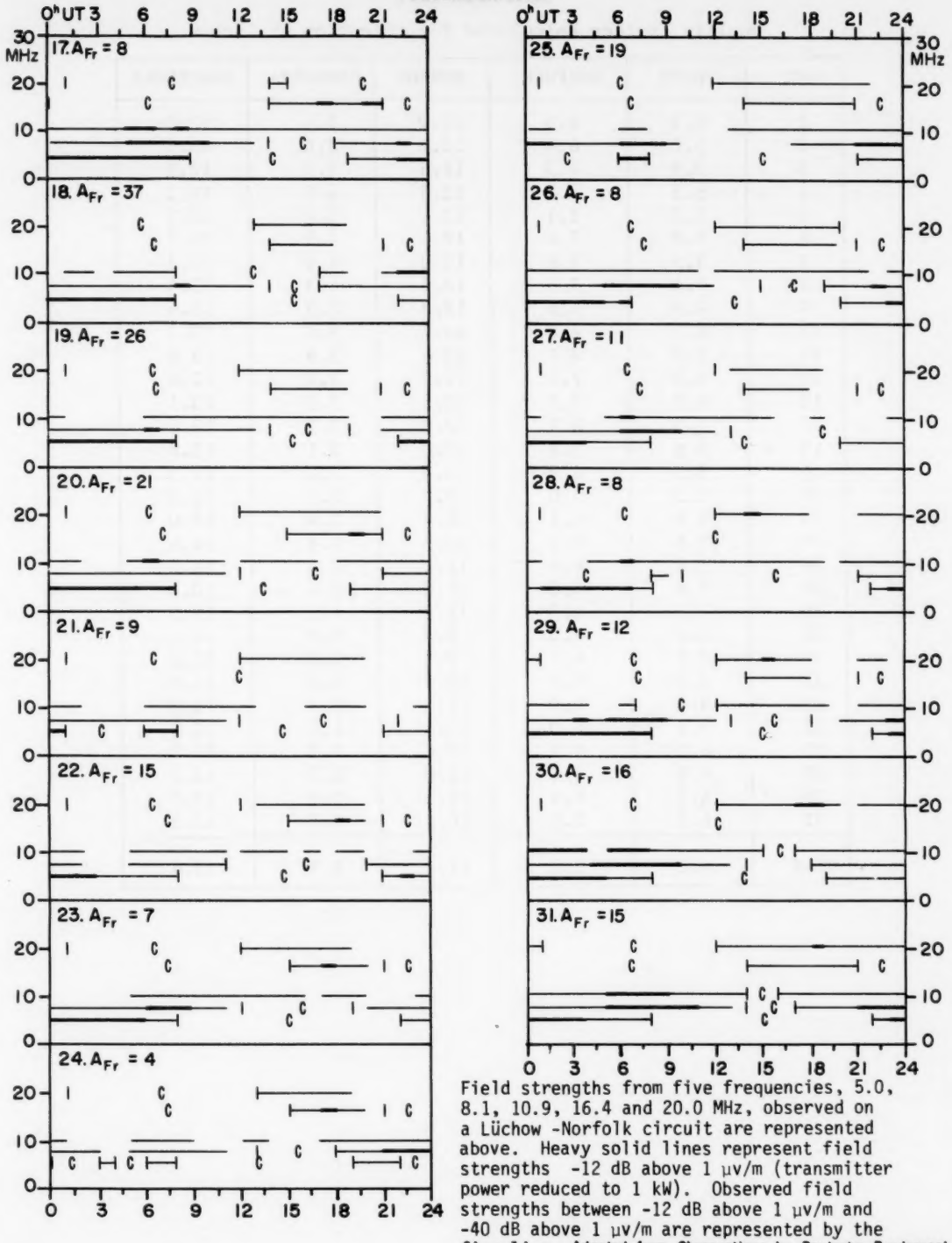
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

DECEMBER 1978



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

DECEMBER 1978



Field strengths from five frequencies, 5.0, 8.1, 10.9, 16.4 and 20.0 MHz, observed on a Lüchow -Norfolk circuit are represented above. Heavy solid lines represent field strengths -12 dB above 1 μv/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μv/m and -40 dB above 1 μv/m are represented by the fine line. Adapted from Observations by Deutsche Bundespost

RADIO PROPAGATION QUALITY INDICES

DECEMBER 1978

Quality Indices calculated for reception at Lüchow

DAY	TOKYO	NORFOLK	MOSCOW	CANBERRA	BRACKNELL
1	4.3	5.5	12.0	3.4	13.0
2	5.0	6.4	12.1	3.6	12.6
3	3.9	7.3	11.6	3.5	12.9
4	5.3	7.7	12.3	4.5	14.2
5	5.2	8.1	12.1	3.7	13.0
6	5.0	7.4	12.6	4.5	13.5
7	3.5	7.6	12.0	4.0	13.3
8	4.4	7.3	12.3	4.3	13.4
9	4.5	7.6	12.3	3.9	13.4
10	4.3	6.8	12.4	3.7	13.2
11	3.9	8.1	12.4	3.9	13.0
12	5.0	7.3	12.2	3.2	12.8
13	4.5	7.3	12.2	3.5	13.1
14	5.5	6.3	12.0	3.3	12.8
15	5.6	5.3	12.0	2.1	12.8
16	5.9	4.9	10.6	2.0	12.5
17	5.3	5.0	9.9	2.1	12.0
18	4.4	4.1	11.4	2.4	12.0
19	3.8	4.1	10.5	2.4	11.4
20	3.2	4.6	11.2	2.2	11.7
21	2.8	4.6	11.0	2.1	10.6
22	2.3	4.2	11.0	1.7	11.5
23	2.4	4.5	9.2	1.8	11.9
24	2.1	4.7	9.6	2.0	11.2
25	2.6	4.1	10.9	2.2	11.8
26	3.4	4.4	11.3	2.4	12.0
27	3.6	4.0	10.8	1.7	10.8
28	4.0	4.9	10.6	1.8	12.3
29	4.9	4.4	11.0	2.5	12.2
30	4.6	4.9	10.8	2.7	12.3
31	4.1	5.0	10.3	1.8	12.5
MEAN	4.2	5.8	11.4	2.9	12.4

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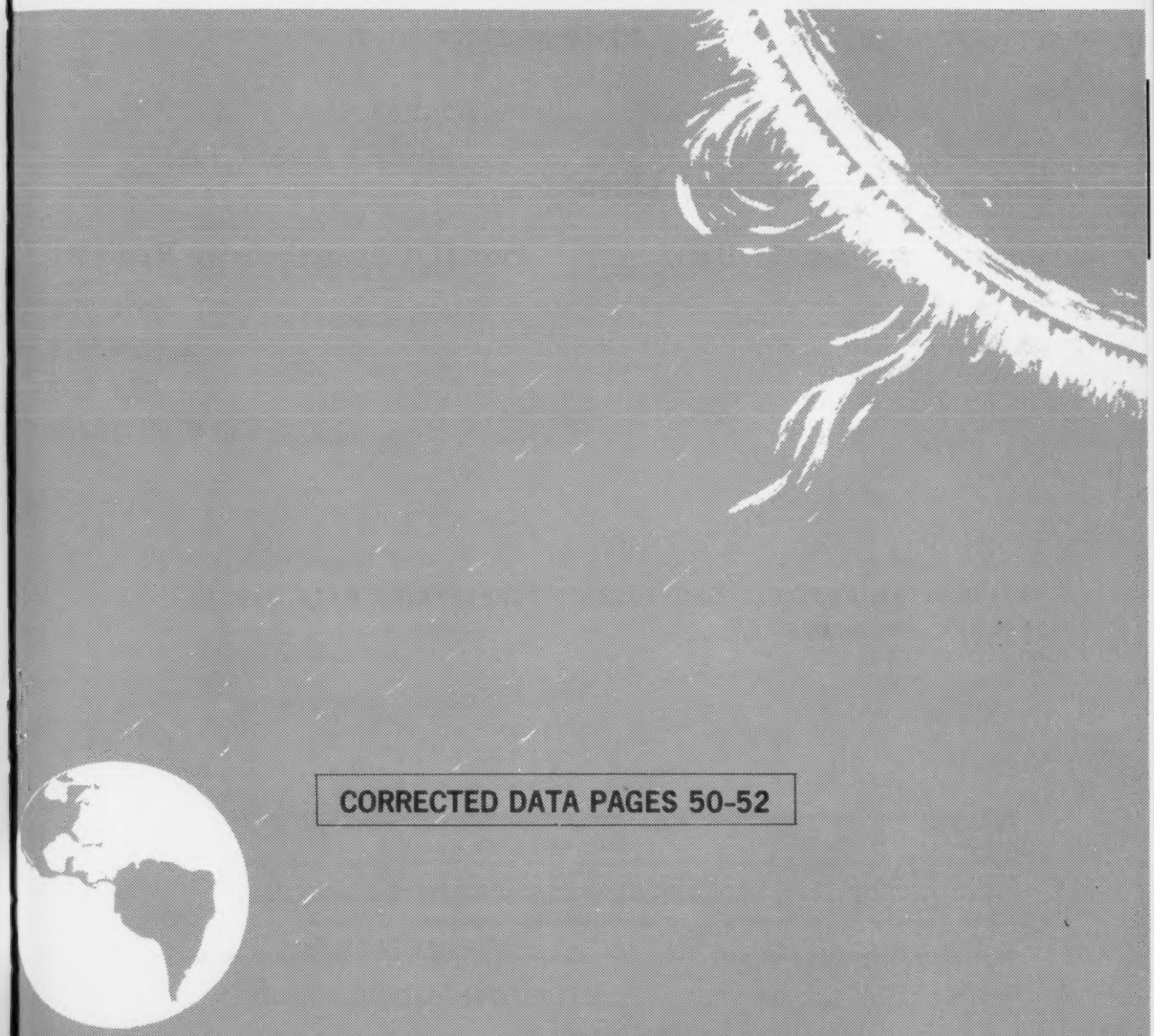
Data for August 1978 -- July 1978 & Miscellanea

Explanation of Data Reports Issued as Number 414 (Supplement) February 1979



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Solar - Geophysical Data

NO. 414 FEBUARY 1979

Part II (Comprehensive Reports)

DATA FOR
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SOLAR-GEOPHYSICAL DATA

No. 414

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Chief
Solar-Terrestrial Physics Division

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DETAILED COVERAGE FOR 1978 AND 1979 PUBLISHED IN "SOLAR-GEOPHYSICAL DATA"

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Solar Radio Waves	
Worldwide Outstanding Occurrences at Fixed Frequencies	25-30
Energetic Solar Particles and Plasma	31-36

ACTIVE REGIONS

CARRINGTON ROTATION 1671

(July 27 to August 23, 1978)

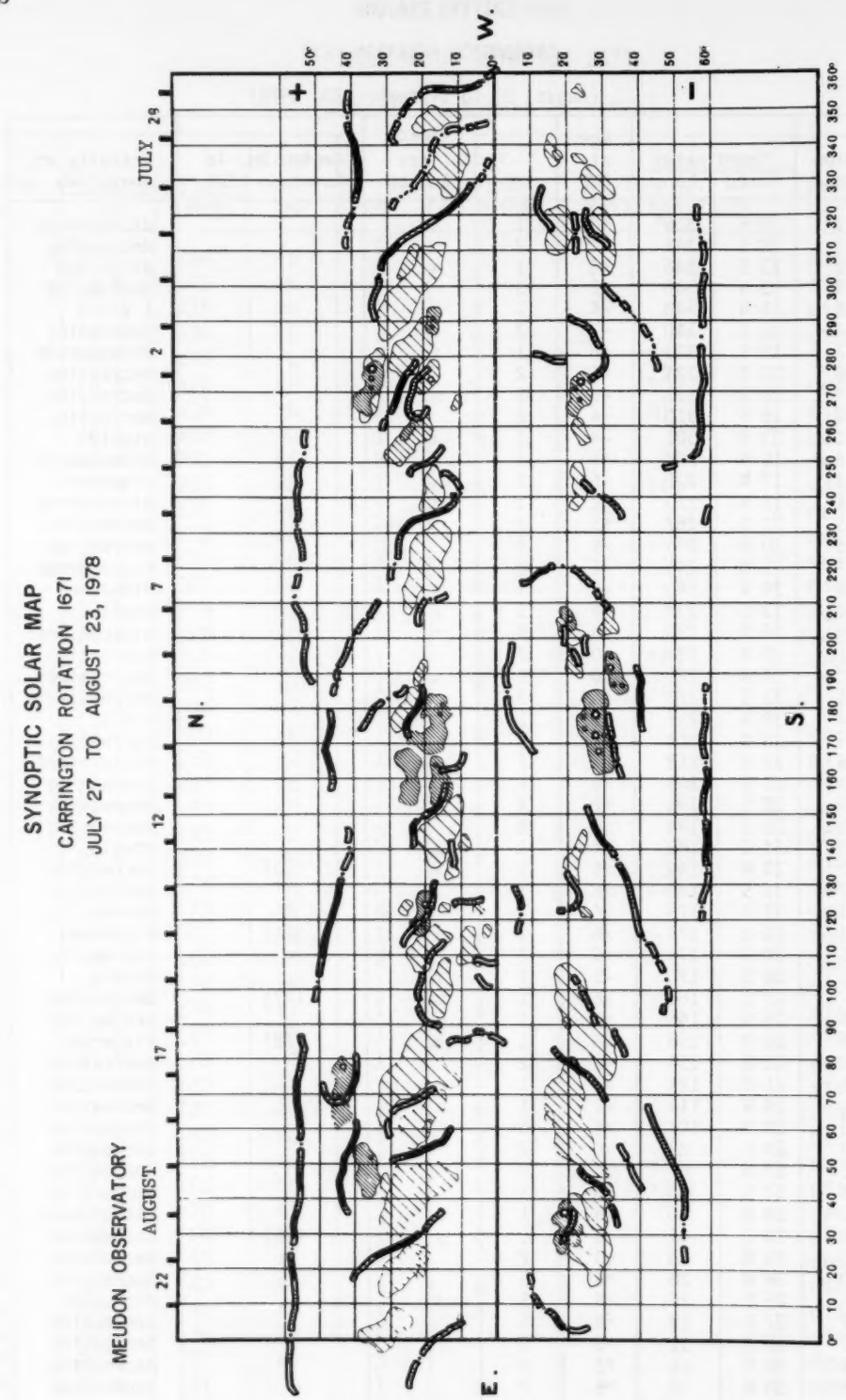
Region No.	Coordinates Lat.	Coordinates Long.	Age at CMP	IMP.	Spot-less Region	Region No. in Rotation 1670	Activity at West Limb
1	23°S	356°	+5	1			disappeared
2	17 N	348	>6	1	x		dispersed
3	15 S	339	>6	1	x		disappeared
4	13 N	334	>6	1	x		dispersed
5	28 S	330	>6	1	x	(7)	dispersed
6	18 S	316	>6	1	x	(10)	decreasing
7	29 S	314	>6	1	x	(8)	dispersed
8	24 N	307	0	1	x		decreasing
9	18 N	291	+4	2			decreasing
10	23 N	283	>6	1	x	(14)	dispersed
11	19 N	275	>6	3			decreasing
12	35 N	272	>6	3			decreasing
13	23 S	270	+6	3			decreasing
14	11 N	267	+5	1	x		disappeared
15	23 S	259	+1	1	x		decreasing
16	25 N	259	0	1	x		decreasing
17	24 N	257	>6	1	x	(16)	decreasing
18	23 S	244	>6	1	x	(18)	dispersed
19	20 S	206	-4	2			increasing
20	32 S	205	>6	1	x		decreasing
21	19 S	203	+4	1			disappeared
22	22 S	192	+6	1	x		disappeared
23	21 N	190	-3	1	x		decreasing
24	33 S	190	-2	3			increasing
25	25 N	180	>6	1	x	(24)	dispersed
26	18 N	176	>6	2		(27)	decreasing
27	28 S	175	>6	6			decreasing
28	24 N	161	>6	1	x		decreasing
29	16 N	160	>6	2			decreasing
30	22 S	137	>6	1	x		dispersed
31	12 N	134	+1	1	x		dispersed
32	15 N	123	+6	1	x		dispersed
33	25 N	123	0	1	x		decreasing
34	21 N	122	-2	3			stable
35	25 S	121	-3	1	x		dispersed
36	8 N	112	>6	1	x		dispersed
37	20 N	112	>6	1	x	(35)	decreasing
38	16 N	100	>6	1	x	(37+40)	dispersed
39	44 N	70	+5	3			decreasing
40	20 S	64	>6	1	x		dispersed
41	37 N	49	>6	2			decreasing
42	32 N	42	+4	1	x		disappeared
43	24 N	41	>6	1	x		dispersed
44	28 S	38	>6	1	x		dispersed
45	20 S	31	>6	3			decreasing
46	21 N	21	0	1	x		decreasing
47	27 N	19	>6	1	x	(51)	decreasing
48	31 N	2	>6	1	x	(53+54)	dispersed

ACTIVE REGIONS

CARRINGTON ROTATION 1672

(August 23 to September 20, 1978)

Region No.	Coordinates Lat.	Coordinates Long.	Age at CMP	IMP	Spot-less Region	Region No. in Rotation 1671	Activity at West Limb
1	9°S	359°	+3	1	x		disappeared
2	20 S	348	-3	2			decreasing
3	23 S	345	+4	1	x		dispersed
4	12 N	340	-2	3			decreasing
5	15 N	340	-4	1	x		(?)
6	23 S	340	-2	2			increasing
7	19 S	333	+5	1	x		disappeared
8	23 S	324	+5	2			decreasing
9	21 N	313	-3	1	x		decreasing
10	16 S	312	+4	2			decreasing
11	23 N	301	-4	1	x		stable
12	10 N	288	+5	1	x		disappeared
13	17 N	275	>6	1	x		dispersed
14	13 N	270	+2	1	x		disappeared
15	21 S	267	+5	2			decreasing
16	20 N	248	>6	4			decreasing
17	41 N	246	>6	1	x		disappeared
18	34 N	240	>6	1	x		dispersed
19	13 S	232	-4	1	x		stable
20	36 N	230	>6	1	x		disappeared
21	37 N	229	0	3			decreasing
22	37 N	223	0	1	x		decreasing
23	21 S	218	>6	3			decreasing
24	39 N	217	-6	1	x		(?)
25	18 N	214	+2	3			decreasing
26	25 N	212	>6	1	x		disappeared
27	18 N	203	>6	5			decreasing
28	22 S	196	+2	4			decreasing
29	30 S	194	>6	8			decreasing
30	14 S	189	-4	1	x		stable
31	23 N	189	>6	1	x	(23)	decreasing
32	32 S	180	>6	2			decreasing
33	37 S	176	>6	2			decreasing
34	19 N	175	>6	1	x	(26)	dispersed
35	20 S	173	>6	2			decreasing
36	38 S	170	-3	1	x		stable
37	27 S	166	>6	1	x	(27)	decreasing
38	15 S	155	>6	1	x		decreasing
39	26 N	155	>6	1	x	(28)	dispersed
40	18 S	134	+5	2			decreasing
41	21 N	124	>6	1	x		decreasing
42	19 N	114	-1	1	x		decreasing
43	33 N	103	>6	5			decreasing
44	23 S	82	0	2			decreasing
45	17 N	67	>6	4			decreasing
46	17 S	52	0	3			decreasing
47	18 N	45	>6	1	x		disappeared
48	19 S	41	>6	1	x	(45)	decreasing
49	19 N	36	+3	2			decreasing
50	36 N	28	>6	5			decreasing
51	25 S	27	>6	1	x		dispersed
52	27 N	19	>6	4			decreasing
53	35 N	11	>6	8			decreasing
54	28 S	10	>6	3			decreasing
55	30 N	8	>6	2			decreasing


SYNOPTIC SOLAR MAP
CARRINGTON ROTATION 1671
JULY 27 TO AUGUST 23, 1978
MEUDON OBSERVATORY
AUGUST
JULY
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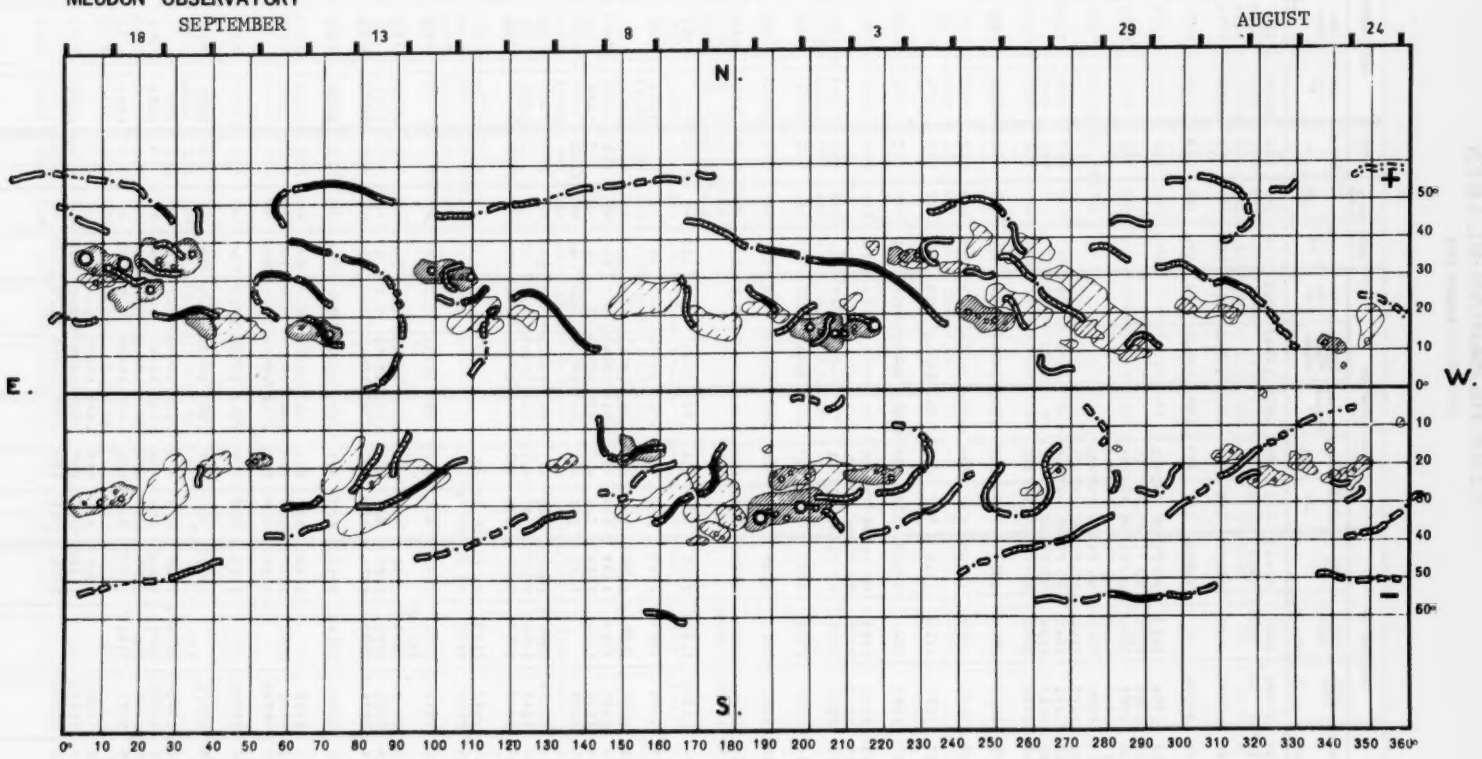
SYNOPTIC SOLAR MAP

CARRINGTON ROTATION 1672

AUGUST 23 TO SEPTEMBER 20, 1978

MEUDON OBSERVATORY



7 Aug 78

Hα SOLAR FLARES

AUGUST 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE AUG	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	GMT DAY	MIN.		COND	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg	
467 KHAR	01	0837E	0837	0844D	S22	E59	.899	15447	5.8	7D	?F		P	0837	110	2.5	D Y5
	IMP,1 NO		MONT2	KANZ2	CATA1												
468 KHAR	01	0855E	0900	0917D	S23	E27	.630	15446	3.4	22D	-F		P	0914			ET Y5
469 KHAR	01	0939E		0949D	S23	E27	.630	15446	3.4	10D	-F		P				ET Y5
	01	1714	1718	NO FLARE PATROL													
	01	1849	1858	NO FLARE PATROL													
	01	1902	1904	NO FLARE PATROL													
	01	1909	1917	NO FLARE PATROL													
	01	1924	1931	NO FLARE PATROL													
	01	2120	2144	NO FLARE PATROL													
	02	2033	2049	NO FLARE PATROL													
	02	2139	2155	NO FLARE PATROL													
	02	2300	2350	NO FLARE PATROL													
470 CULG	03	0513	0516	0555	N13	E03	.230	15445	3.4	42	-F		C	0516	30	.3	Y5
471 KANZ	03	1003	1007	10140	S23	E90	1.001	15454	10.2	11D	-F		C				Y5
472 KANZ	03	1103	1106	1106	N37	W02	.517	15441	3.3	3	-F		C				FH Y5
473 KANZ	03	1340	1343	1348D	S28	E90	1.001	15454	10.3	8D	-B		C				Y5
	03	2118	2203	NO FLARE PATROL													
	03	2212	2213	NO FLARE PATROL													
	03	2216	2224	NO FLARE PATROL													
474 CULG	03	2346	2351	0023	N37	W07	.526	15441	3.5	37	-N		C	2351	60	.8	Y5
475 CULG	04	0210	0217	0235	S24	W13	.538	15446	3.1	25	-N		C	0217	40	.5	Y5
476 CULG	04	0328	0354	0635D	N21	E58	.848	0	8.5	187D	?N		C	0354	140	2.7	S Y5
	IMP,1 NO		VORO2														
477 TEHR	04	1130E	1132U	1148	S21	E16	.518	15447	5.7	18D	-B	2	C		159		U H Y5
478 HCMA	04	1553	1559	1609	S23	W15	.537	15446	3.5	16	-N		C	1559	60	.8	E Y5
GRP68479	04	1624+1	1626+2	1634	S20	W18	.522	15446	3.3	10	-N						E
KANZ	04	1624	1628	1639	S19	W18	.510	15446	3.3	15	-B		C				
HCMA	04	1624	1626	1634	S20	W18	.522	15446	3.3	10	-N		C	1626	50	.7	E
HUAN	04	1625		1631	S20	W18	.522	15446	3.3	6	-F	1	C				E
GRP68480	04	1847+2	1856+1	1901D	S20	W21	.547	15446	3.2	14	-F				45	.5	EH
HCMA	04	1847	1856	2000D	S20	W20	.539	15446	3.3	73D	-F		C	1856	50	.7	EH
PALE	04	1849	1857	1901	S21	W22	.567	15446	3.1	12	-N	3	C		39		DE
	04	2102	2125	NO FLARE PATROL													
	04	2128	2130	NO FLARE PATROL													
GRP68481	04	2222+2	2224	2243	N36	W22	.590	15441	3.3	21	-N				40	.5	E
			2232+4														
CULG	04	2222	2236	2250	N36	W22	.590	15441	3.3	28	-N		C	2236	40	.5	
VORO	04	2224	2224	2228	N36	W22	.590	15441	3.3	4	-N		C	2224	36	.4	E
VORO	04	2231	2232	2236	N36	W22	.590	15441	3.3	5	-N		C	2232	36	.4	E
482 CULG	05	0314E	0314U	0317D	S22	W21	.571	15446	3.6	3D	-N		P	0314	50	.6	Y5
GRP68483	05	0618		0645D	S25	E66	.947	15454	10.2	27	-N						K
KANZ	05	0618	0637	0637D	S26	E68	.957	15454	10.4	19D	-N		C				
ISTA	05	0620E		0645D	S25	E65	.942	15454	10.1	25D	-N						K
484 ISTA	05	0755E		0759	S25	E65	.942	15454	10.2	4D	-F						Y5
485 KHAR	05	0957E		1050D	N16	E87	.997	15451	11.9	53D	-F		P	1000			D Y5
GRP68486	05	1022+3	1028+3	1102	S19	W28	.605	15446	3.3	4D	-F						H
KHAR	05	1022E	1028	1108D	S21	W28	.623	15446	3.3	46D	1F		P	1028	150	2.1	H
KANZ	05	1023	1031	1055	S18	W29	.607	15446	3.3	32	-N		C				
ZURI	05	1025	1031	1033D	S19	W28	.605	15446	3.3	8D	-F		P	1031	50	.7	
GRP68487	05	1102E		1315	N16	E83	.989	15451	11.7	133	-F						D
KHAR	05	1102E		1150D	N16	E87	.997	15451	12.0	48D	-F		V	1112			D
KANZ	05	1121E		1315	N16	E80	.981	15451	11.5	114D	-N		C				T

Hα SOLAR FLARES

AUGUST 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE AUG	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
GRP68488	05	1249+2	1253+4	1318	S20	W30	.634	15446	3.3	29	-N				45	.6		
KANZ	05	1249	1257	1318	S19	W30	.626	15446	3.3	29	-B		C					
MCMA	05	1251	1255	1330D	S20	W31	.644	15446	3.2	39D	-N		C	1255	35	.5	E	
RAMY	05	1251	1253	1304	S20	W27	.605	15446	3.5	13	-N	3	C		48		FDE	
489 MCMA	05	1349	1356	1520D	S20	W31	.644	15446	3.3	91D	-B		C	1356	80	1.1	EH	Y5
490 MCMA	05	1457	1505	1530	N20	W53	.801	15444	1.6	33	-F		C	1505	50	.9	E	Y5
491 MCMA	05	1520	1529	1550	S20	W32	.654	15446	3.2	30	-N	*	C	1529	40	.5	E	Y5
	05	2150	2259	NO FLARE PATROL														
GRP68492	06	0415	0422	0426	S28	E60	.921	15454	10.7	11	-F						E	
MITK	06	0415		0424	S28	E61	.927	15454	10.8	9	-F		C	0415		.3		
TACH	06	0420E	0422	0427	S28	E60	.921	15454	10.7	7D	1F		C	0422	132	3.4	E	
493 ABST	06	0618	0620	0625	S26	E61	.922	15454	10.8	7	-N		C	0620	87		DJ	Y5
GRP68494	06	0712+4	0717+2	0728	S26	E58	.904	15454	10.6	16	-F						DJ	
ABST	06	0712	0717	0725	S26	E60	.916	15454	10.8	13	-N		C	0717	87		DJ	
KANZ	06	0716	0719	0730	S27	E56	.894	15454	10.5	14	-F		C					
495 KANZ	06	0943	1015	1051	S29	E57	.907	15454	10.7	68	-F		C				H	Y5
496 KANZ	06	1238	1242	1254	N26	W79	.976	15448	30.6	16	-F		C					Y5
GRP68497	06	1251+0	1252+1	1300	S22	W39	.736	15446	3.6	9	-B						F	
KANZ	06	1251	1253	1301	S21	W40	.740	15446	3.5	10	-B		C					
RAMY	06	1251	1252	1259	S23	W38	.734	15446	3.7	8	-B	3	C		60		F	
498 KANZ	06	1514	1518	1527	S21	W42	.758	15446	3.5	13	-F		C					Y5
	06	2153	2159	NO FLARE PATROL														
	06	2211	2306	NO FLARE PATROL														
	06	0014	0016	NO FLARE PATROL														
499 KHAR	07	1050E	1050	1057D	S26	E45	.811	15454	10.8	7D	-F		P	1050	100	1.8	T	Y5
GRP68500	07	1114E		1135D	S28	E41	.791	15454	10.5	21	-B						H	
KHAR	07	1114E		1206D	S28	E44	.814	15454	10.8	52D	1N		P	1130	250	4.8	EHT	
RAMY	07	1126E	1126U	1135	S28	E39	.775	15454	10.4	9D	-B	2	C		42		F	
GRP68501	07	1114E	1126+3	1147	S22	E26	.615	15450	9.4	33	-N						H	
KHAR	07	1114E	1129	1145D	S22	E26	.615	15450	9.4	31D	-N		P	1130	120	1.5	EH	
RAMY	07	1126E	1126U	1147	S22	E26	.615	15450	9.4	21D	-N	2	C		28		F	
502 KHAR	07	1131E	1131	1135D	N35	W56	.856	15441	3.3	4D	-F		P				E	Y5
	07	1525	1554	NO FLARE PATROL														
	07	0114	0122	NO FLARE PATROL														
	07	0130	0137	NO FLARE PATROL														
	07	0142	0200	NO FLARE PATROL														
503 RAMY	07	1629	1631	1633	S26	E38	.754	15454	10.5	4	-N	3	C		25		F	Y5
504 HOLL	07	1736	1749	1758D	S26	E40	.771	15454	10.7	22D	-F	3	C		50		FDE	Y5
505 PALE	07	1912	1912U	2005D	S26	E38	.754	15454	10.7	53D	-N	3	C		20		DE	Y5
GRP68506	07	2010+4	2018	2034	S26	E37	.746	15454	10.6	24	-N							
HOLL	07	2010	2018	2022	S26	E38	.754	15454	10.7	12	-N	3	C		56		DE	
PALE	07	2014		2046	S26	E37	.746	15454	10.6	32	-N	2	C				DE	
507 HOLL	07	2215	2218	2225	S26	E37	.746	15454	10.7	10	-N	3	C		36		DE	Y5
GRP68508	07	2311	2316	2356	S26	E37	.746	15454	10.7	45	-B						FH	
HOLL	07	2311	2316	0003	S26	E36	.737	15454	10.7	52	-B	3	C		93		F H	
VORO	07	2345E		2348	S26	E38	.754	15454	10.8	3D	-N		C	2345	72	1.1		
509 CULG	08	0550	0555	0605	N21	W70	.934	15443	3.0	15	-F		C	0555	20			Y5
510 MCMA	08	1210	1226	1300	N19	W74	.956	15443	3.0	50	-N		C	1226	20	1.0	D	Y5
511 RAMY	08	1414	1415	1424	S26	E27	.663	15454	10.6	10	-N	3	C		30		F	Y5
512 RAMY	08	1438	1438	1442	N20	E35	.597	15451	11.2	4	-N	3	C		32			Y5

Hα SOLAR FLARES

AUGUST 1978

OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE AUG	START	MAX. PHASE	END	APPROX LAT.	APPROX LONG. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
513 RAMY	08	1444	1510	1519	S26	E26	.655	15454	10.6	35	-N	3	C		35		F	Y5
	08	2114	2212	NO FLARE PATROL														
	08	2216	2304	NO FLARE PATROL														
	08	2305	2325	NO FLARE PATROL														
	08	0113	0139	NO FLARE PATROL														
	08	0144	0216	NO FLARE PATROL														
	08	0043	0112	NO FLARE PATROL														
514 CULG	08	2327	2341	2357	S24	W80	.994	15446	3.0	30	-N		C	2341	30		J	Y5
515 CULG	09	0244	0245	0252	S28	E20	.634	15454	10.6	8	-F		C	0245	30	.4		Y5
516 CULG	09	0308	0311	0326	S24	W88	1.000	15446	2.5	18	-F		C	0311	20			Y5
517 CULG	09	0508E	0512	0513D	S32	E17	.664	15454	10.5	5D	-F		P	0512	60	.8	FI	Y5
518 ISTA	09	0655		0700	S29	E21	.652	15454	10.9	5	-B			0658				Y5
519 KHAR	09	0837E		0912D	S27	E18	.610	15454	10.7	35D	-F		P	0910			D	Y5
520 KHAR	09	1112E		1112D	N16	E65	.901	15458	14.3		-F		P	1112	100		D	Y5
521 KANZ	09	1141	1145	1145D	N16	E27	.472	15451	11.5	4D	-F		C					Y5
	09	1710	1719	NO FLARE PATROL														
	09	1750	1812	NO FLARE PATROL														
	09	1818	1824	NO FLARE PATROL														
	09	1859	1913	NO FLARE PATROL														
	09	2037	2132	NO FLARE PATROL														
	09	0109	0114	NO FLARE PATROL														
522 PALE	09	2329	2329	2342	N16	E06	.197	15451	10.4	13	-N	3	C		62		DE	Y5
523 CULG	10	0235E	0236	0251	N15	E05	.173	15451	10.5	16D	-N		C	0236	30	.3		Y5
524 CULG	10	0358	0402	0416	N15	E05	.173	15451	10.5	18	-F		C	0402	30	.3		Y5
525 CULG	10	0425	0435U	0510	N23	W70	.934	15443	4.9	45	-F		C	0435	60		FS	Y5
526 CULG	10	0459	0500	0525	N15	E04	.165	15451	10.5	26	-N		C	0500	40	.4	K	Y5
527 CULG	10	0633	0642	0645D	S23	E45	.797	15461	13.7	7D	-F		P	0642	20	.3		Y5
528 ZURI	10	1314E	1314	1320D	S25	E02	.521	15454	10.7	6D	-F		P	1314	60	.7		Y5
GRP68529	10	1541+5	1547+3	1612	S26	00	.535	15454	10.7	31	-N				80	.9		
HOLL	10	1541	1547	1611	S26	E02	.536	15454	10.8	30	-B	3	C		107		F	
MCMA	10	1546	1550	1613	S26	W01	.535	15454	10.6	27	-N		C	1550	50	.6	E	
530 HOLL	10	1621	1641	1647	S26	E01	.535	15454	10.8	26	-N	3	C		48			Y5
531 HOLL	10	1656	1656	1715	S26	E01	.535	15454	10.8	19	-N	3	C		29			Y5
GRP68532	10	1730+4	1735	1743	N15	W03	.159	15451	10.5	13	-F				30	.3	E	
MCMA	10	1730		1744D	N15	W02	.154	15451	10.6	14D	-F		C	1740	30	.3	E	
HOLL	10	1734	1735	1741	N16	W04	.181	15451	10.4	7	-N	3	C		34			
533 HOLL	10	1751	1751	1758	S26	E01	.535	15454	10.8	7	-N	3	C		26			Y5
534 CULG	10	2130	2144U	2155	N15	W08	.202	15451	10.3	25	-F		C	2144	30	.3		Y5
	10	2252	2310	NO FLARE PATROL														
	10	2313	2320	NO FLARE PATROL														
535 PALE	11	0038	0038	0042	N15	W08	.202	15451	10.4	4	-N	3	C		22		DE	Y5
536 CULG	11	0113	0116	0127	N16	W09	.225	15451	10.4	14	-F		C	0116	20	.2		Y5
537 CULG	11	0249	0251	0256	S28	W09	.581	15454	10.4	7	-F		C	0250	20	.2		Y5
538 CULG	11	0339	0347	0410	N17	E06	.210	15451	11.6	31	-F		C	0347	30	.3	H	Y5
GRP68539	11	0340+1	0343+2	0355	S27	W07	.561	15454	10.6	15	-B				40	.5		
CULG	11	0340	0344	0355	S28	W09	.581	15454	10.5	15	-N		C	0344	30	.4		
TEHR	11	0341E	0343	0356	S27	W06	.558	15454	10.7	150	-B	2	C		127		DE	
PALE	11	0341	0345	0353	S26	W07	.546	15454	10.6	12	-B	3	C		44		DE	

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE AUG	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
540 CULG	11	0452	0455	0507	S29	W11	.601	15454	10.4	15	-N		C	0455	50	.6		Y5
541 ISTA	11	0734		0755	N19	E42	.678	15458	14.5	21	-F						D	Y5
542 ISTA	11	0800		0808	S24	W08	.521	15454	10.7	8	-F						D	Y5
543 KHAR	11	0814E		0820D	S24	W12	.539	15454	10.4	60	-F		P				DT	Y5
GRP68544	11	0925+3	0928+0	0936D	N16	W14	.288	15451	10.3	11	-N						DH	
KHAR	11	0925E	0928	0936D	N16	W14	.288	15451	10.3	11D	-F		V	0927			DH	
KANZ	11	0928	0928	0931D	N16	W14	.288	15451	10.3	3D	-B		C					
545 KHAR	11	1003E	1013	1017D	S28	W08	.578	15454	10.8	14D	-F		P				DT	Y5
GRP68546	11	1029+6	1037+0 1051	1117	S28	W10	.584	15454	10.7	48	-N				110	1.3	EJ	
ZURI	11	1029	1037	1117	S28	W11	.588	15454	10.6	48	-N		C	1037	70	.9		
KHAR	11	1030E	1037	1103D	S29	W12	.605	15454	10.5	33D	1N		P	1037	150	2.2	ET	
ABST	11	1035	1051	1100	S28	W10	.584	15454	10.7	25	-F		C	1051	87	1.1	EJ	
KHAR	11	1103E		1127D	S28	W07	.575	15454	10.9	24D	-F		P				DT	
GRP68547	11	1206+5	1209+4	1227	S28	W12	.592	15454	10.6	21	-N							
KHAR	11	1206E	1209	1227D	S29	W12	.605	15454	10.6	21D	1N		P	1213	200	2.8	ET	
RAMY	11	1211	1213	1223	S26	W11	.561	15454	10.7	12	-B	2	C		44		FDE	
ZURI	11	1211	1213	1233D	S28	W12	.592	15454	10.6	22D	-N		P	1213	70	.9		
	11	1729	1737	NO FLARE PATROL														
548 PALE	11	2025	2025	2030	N16	W19	.357	15451	10.4	5	-B	3	C		42		DE	Y5
	11	2045	2105	NO FLARE PATROL														
	11	2127	2136	NO FLARE PATROL														
	11	2149	2151	NO FLARE PATROL														
	11	2219	2224	NO FLARE PATROL														
	11	2231	2245	NO FLARE PATROL														
	11	2253	2259	NO FLARE PATROL														
	11	2300	2303	NO FLARE PATROL														
GRP68549	11	2355+7	0002+0	0015	S24	W18	.575	15454	10.6	20	-F							
PALE	12	0002	0002	0010	S26	W18	.600	15454	10.7	8	-N	3	C		20		DE	
CULG	11	2355	2402U	0019D	S23	W19	.571	15454	10.6	24D	-F		C	2402	100	1.2		
550 CULG	12	0054E	0055U	0101D	S30	W21	.665	15454	10.5	7D	-F		P	0055	50	.7	F	Y5
551 CULG	12	0118	0146	0310	S23	E24	.611	15461	13.9	112	-F		C	0146	60	.7	SF	Y5
552 KHAR	12	0851E		0854D	S33	W40	.817	15470	9.4	3D	-F		P				DT	Y5
GRP68553	12	0904+4	0914	0926	S32	W38	.797	15470	9.5	22	-F						E	
KHAR	12	0904E		0927D	S33	W40	.817	15470	9.4	23D	-F		P				ET	
ZURI	12	0908	0914	0924	S31	W37	.783	15470	9.6	16	-F		C	0914	50	.9		
554 KHAR	12	0941E	0957	1004D	S21	W57	.885	15474	8.1	23D	-F		P	0956			T	Y5
555 KHAR	12	0941E		0947D	S34	W42	.836	15470	9.3	6D	-F	*	P				DT	Y5
556 KHAR	12	0957E		1004D	S33	W39	.810	15470	9.5	7D	-F		P				ET	Y5
GRP68557	12	1023+1	1024+2	1048	S33	W38	.804	15470	9.6	25	-F				70	1.1	EJ	
ABST	12	1023	1026	1035	S34	W38	.810	15470	9.6	12	-F		C	1026	87	1.3	EJ	
ZURI	12	1024	1024	1048D	S31	W38	.790	15470	9.6	24D	-F		P	1024	60	1.1		
KHAR	12	1044E	1050	1150D	S33	W42	.830	15470	9.3	66D	-F		P	1054			ET	
558 KHAR	12	1054E	1054	1113D	S20	W58	.890	15474	8.1	19D	-F		P	1106			DT	Y5
559 KHAR	12	1105E	1117	1130D	S33	W23	.708	15454	10.7	25D	-N		P	1117	120	1.7	EL	Y5
560 KHAR	12	1150E	1159	1211D	S20	W57	.883	15474	8.2	21D	-F		V	1159			T	Y5
561 KHAR	12	1222E		1222D	S33	W42	.830	15470	9.4		-F		P				ET	Y5
GRP68562	12	1231	1236	1243	N15	W30	.510	15451	10.3	12	-F						E	
MCMA	12	1231	1236	1243	N15	W30	.510	15451	10.3	12	-F		C	1236	20	.3	E	
KHAR	12	1235E		1238D	N15	W31	.524	15451	10.2	3D	-F		P					
563 KHAR	12	1235E		1255D	S21	W58	.892	15470	8.2	20D	-F		P				T	Y5

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONF.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	AUG																	
564 KHAR	12	1235E		1252D	S33	W42	.830	15474	9.4	17D	-F	*	P				ET	Y5
565 KHAR	12	1305E		1318D	S33	W42	.830	15470	9.4	13D	-F		P				ET	Y5
566 MCMA	12	1526	1529	1545	S25	W27	.656	15454	10.6	19	-F		C	1529	30	.4	E	Y5
567 MCMA	12	1558E		1605	N15	W31	.524	15451	10.3	7D	-F		C	1558	20	.3	E	Y5
GRP68568	12	1900>9	1915+3	1937	S21	W58	.892	15474	8.4	37	-N				50	1.1		
RAMY	12	1900	1915	1944	S23	W58	.898	15474	8.4	44	-N	3	C		47			
PALE	12	1913	1918	1930	S20	W59	.897	15474	8.4	17	-N	3	C		63		DE	
569 RAMY	12	1925	1927	1934	S34	W41	.829	15470	9.7	9	-N	3	C		16			Y5
570 RAMY	12	1959	2000	2005	S23	W58	.898	15474	8.5	6	-N	3	C		18			Y5
571 CULG	12	2131	2135	2142	S19	W62	.915	15474	8.2	11	-N		C	2135	40	1.0	T	Y5
572 CULG	12	2240	2248	2305	N34	E90	.998	15472	19.7	25	-N		C	2248	40			Y5
573 CULG	13	0106	0128	0143	N34	E90	.998	15472	19.8	37	-N		C	0128	20			Y5
574 PALE	13	0224E	0231U	0245D	S20	W63	.923	15474	8.4	21D	-N	2	C		25		F	Y5
575 CULG	13	0233	0236	0240	N34	E90	.998	15472	19.9	7	-N		C	0236	20			Y5
GRP68576	13	0404>9	0407 0443	0453	S19	W67	.944	15474	8.1	49	-N						E	
TACH	13	0404E	0407	0448	S19	W66	.939	15474	8.2	44D	1N		C	0417	172		E	
CULG	13	0440	0443	0457	S20	W68	.950	15474	8.1	17	-N		C	0443	60		T	
577 TACH	13	0412	0414	0420	S31	W49	.866	15470	9.5	8	-F		C	0417	66	1.3	D	Y5
578 CULG	13	0434	0440	0456	N33	E90	.998	15472	19.9	22	-F		C	0440	20			Y5
579 KHAR	13	0848E		0914D	S32	W54	.900	15470	9.3	26D	?N		P	0848	150	3.8		Y5
	IMP+1	NO	ABST1	CATA1														
580 KHAR	13	0908E		0926D	S21	W71	.965	15474	8.1	18D	-N		P	0916			D	Y5
581 ABST	13	0916	0924	0940	N40	E70	.943	15471	18.6	24	-F		C	0924	87		EJ	Y5
582 KHAR	13	0953E		1001D	S23	W39	.746	15454	10.5	8D	-F		V	0956			D	Y5
583 RAMY	13	1104E	1104U	1115	S23	W66	.945	15474	8.5	11D	-B	3	C		35		F	Y5
584 RAMY	13	1109	1115	1120	N46	E59	.899	15471	17.9	11	-F	3	C		29		F	Y5
GRP68585	13	1158>9	1218 1223+4	1250	S21	W68	.952	15474	8.4	52	-B				90		H	
MCMA	13	1158	1225	1245	S22	W73	.974	15474	8.0	47	1B		C	1225	50	2.0	E	
KHAR	13	1206E	1218	1238D	S21	W70	.961	15474	8.3	32D	1N		P	1222	180		H	
TEHR	13	1220	1227	1250	S21	W65	.936	15474	8.6	30	-B		C		111	300.0	2	
RAMY	13	1221	1223	1250	S22	W67	.948	15474	8.5	29	-B	3	C		77		F	
GRP68586	13	1254	1255 1412	1420	S26	W38	.757	15454	10.7	86	-B				35	.5		
RAMY	13	1254	1255	1404	S25	W37	.741	15454	10.8	70	-B	3	C		21		F	
MCMA	13	1350E		1415	S26	W40	.773	15454	10.6	25D	-F		C	1411	50	.8	E	
RAMY	13	1410	1412	1425	S27	W37	.755	15454	10.8	15	-B	3	C		24		F	
GRP68587	13	1418+5	1424+3	1434	S22	W70	.962	15474	8.3	16	-N				25		D	
MCMA	13	1418	1427	1438	S22	W73	.974	15474	8.1	20	-N		C	1427	30	1.2	D	
RAMY	13	1423	1424	1430	S22	W67	.948	15474	8.6	7	-N	3	C		18			
588 RAMY	13	1443	1444	1450	S27	W37	.755	15454	10.8	7	-B	3	C		23		F	Y5
GRP68589	13	1525+1	1532+2	1545	S22	W69	.958	15474	8.5	20	-N				30		D	
MCMA	13	1525	1532	1545	S22	W73	.974	15474	8.2	20	-N		C	1532	30	1.2	D	
HOLL	13	1526	1534	1539	S24	W69	.960	15474	8.5	13	-N	3	C		20			
RAMY	13	1526	1534	1546	S22	W68	.953	15474	8.5	20	-B	3	C		31			
590 RAMY	13	1616	1616	1624	S28	W37	.762	15454	10.9	8	-N	3	C		16			Y5
GRP68591	13	1639>9	1655+1	1708	S23	W70	.963	15474	8.4	29	-N				30			
RAMY	13	1639	1655	1712	S23	W70	.963	15474	8.4	33	-B	3	C		41			
HOLL	13	1653	1656	1703	S24	W70	.964	15474	8.5	10	-N	3	C		18			

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE (AUG)	START	MAX. PHASE	END	APPROX LAT.	APPROX LONG. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		COND	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg	
592 RAMY	13	1655	1655	1703	S28	W37	.762	15454	10.9	8	-N	3	C		17		Y5
GRP68593	13	1755+3	1759+1	1817	S23	W71	.967	15474	8.4	22	-B				40		U
RAMY	13	1755	1800	1817	S23	W70	.963	15474	8.5	22	-B	3	C		67		
HOLL	13	1756	1759	1811	S24	W71	.968	15474	8.4	15	-B	3	C		32		U F
PALE	13	1758	1800	1832	S20	W71	.964	15474	8.4	34	-B	3	C		30		FDE
	13	1940	2020	NO FLARE PATROL													
	13	2043	2052	NO FLARE PATROL													
594 CULG	13	2143E	2143E	2150	S30	W61	.933	15470	9.3	7D	-F		P	2143	20		Y5
595 CULG	13	2312	2320	2335	S31	W62	.940	15470	9.3	23	-N		C	2320	50		Y5
596 CULG	13	2328	2334	2345	S20	W80	.992	15474	8.0	17	-F		C	2334	40		Y5
597 CULG	13	2359	2402	0007	S28	W51	.867	15454	10.2	8	-F		C	2402	30	.6	Y5
598 CULG	14	0002	0021	0048	S33	W59	.930	15470	9.6	46	1F		C	0021	90	2.3	Y5
599 CULG	14	0125	0127	0145	S24	W45	.804	15454	10.7	20	-N		C	0127	30	.5	Y5
600 CULG	14	0210	0224	0244	N38	E53	.841	15471	18.1	34	-F		C	0224	40	.8	Y5
601 CULG	14	0411	0417	0445	S23	W49	.832	15454	10.5	34	-F		C	0417	40	.7	Y5
602 CULG	14	0450	0453	0459	S35	W58	.931	15470	9.9	9	-F		C	0453	20		Y5
603 CULG	14	0601	0613U	0621	S32	W67	.963	15470	9.2	20	-F		P	0613	20		F Y5
604 KHAR	14	0825E		0838D	S20	W88	1.000	15474	7.8	13D	-F		P				Y5
605 ZURI	14	0933E	0933	0939	S24	W51	.851	15454	10.6	6D	-F		P	0933	60	1.2	Y5
606 KHAR	14	0940E	0947	1005D	S20	W88	1.000	15474	7.8	25D	-F		P	0950			Y5
607 RAMY	14	1152	1248	1308	N19	W80	.980	0	8.5	76	-N	3	C		12		Y5
608 RAMY	14	1247	1250	1310	S34	W63	.951	15470	9.8	23	-B	3	C		14		Y5
609 RAMY	14	1320	1325	1348	S34	W63	.951	15470	9.8	28	-N	3	C		14		Y5
610 RAMY	14	1329	1329	1337	N19	W80	.980	0	8.6	8	-N	3	C		8		Y5
GRP68611	14	1736	1738+0	1759	S28	W52	.874	15454	10.8	23	-N				45	.9	E
PALE	14	1736	1738	1759	S27	W52	.870	15454	10.8	23	-N	3	C		42		DE
HCMA	14	1737E	1738	1757D	S29	W53	.884	15454	10.8	20D	-N		C	1738	50	1.0	E
612 PALE	14	2105	2106	2111	S27	W53	.877	15454	10.9	6	-N	3	C		37		DE Y5
GRP68613	14	2141+1	2141+1	2147	S28	W55	.893	15454	10.8	6	-F				20	.4	
CULG	14	2141	2141	2146	S28	W56	.900	15454	10.7	5	-F		C	2141	20	.5	
HOLL	14	2142	2142	2147	S29	W55	.897	15454	10.8	5	-N	3	C		24		
614 CULG	15	0121	0129	0140	S28	W71	.973	15454	9.7	19	-F		C	0129	40		Y5
615 CULG	15	0145	0200	0325	S33	W75	.988	15470	9.4	100	-N		C	0200	30		KT Y5
616 CULG	15	0233	0242	0258	S28	W55	.894	15454	11.0	25	-N		C	0242	20	.5	Y5
GRP68617	15	0318+3	0322+3 0334	0336	N44	E37	.759	15471	17.9	18	1N				140	2.2	
CULG	15	0318	0322	0345	N44	E37	.759	15471	17.9	27	1N		C	0322	140	2.1	
VORO	15	0321	0325	0332	N46	E35	.761	15471	17.8	11	1F		C	0325	152	2.3	
TEHR	15	0330E	0334	0336	N44	E44	.804	15471	18.4	6D	-N	2	C		127		
GRP68618	15	0724	0728	0738	S11	E69	.945	0	20.5	14	-F						
KANZ	15	0724	0728	0739	S11	E67	.933	0	20.3	15	-F		C				
ZURI	15	0732E	0732	0736	S12	E72	.961	0	20.7	4D	-F		P	0732	60		
GRP68619	15	0742+0	0746+0	0749	N44	E34	.740	15471	17.9	7	-N				70	1.1	D
KANZ	15	0742	0746	0749	N44	E33	.734	15471	17.8	7	-B		C				D
ZURI	15	0742	0746	0748	N46	E34	.756	15471	17.9	6	-F		C	0746	50	.8	
ABST	15	0745E	0746	0750	N44	E35	.746	15471	17.9	5D	-F		P	0746	87	1.3	D
620 KANZ	15	0806	0809	0824	N04	W04	.083	15462	15.0	18	-F		C				G Y5

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE AUG	START	MAX. PHASE	END	APPROX LAT.	APPROX LONG. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
GRP68621	15	0844+0	0846+3	0900	S29	W60	.926	15454	10.9	16	-F		C				E
ZURI	15	0844	0846	0856	S29	W60	.926	15454	10.9	12	-F		C	0846	40		
KANZ	15	0844	0849	0900	S29	W61	.931	15454	10.8	16	-F		C				
KHAR	15	0848E		0908D	S30	W60	.928	15454	10.9	200	-N		P				ET
GRP68622	15	0952>9	1006+6 1017+6	1034	S30	W64	.948	15454	10.6	42	1N				120		EJU
KHAR	15	0910E	0936	1025D	S22	W67	.949	15454	10.4	75D	-F		P	0936			ET
KHAR	15	0913E	1006	1025D	S33	W68	.968	15454	10.3	72D	1N		P	100E			T
KANZ	15	0952	1008	1014	S31	W62	.940	15454	10.8	22	-N		C				
ABST	15	1006E	1012	1021	S31	W66	.958	15454	10.5	15D	1F		P	1012	79		DJ
HURB	15	1013E	1017	1039D	S32	W70	.974	15454	10.2	26D	1N		V				
KHAR	15	1014E	1018	1047D	S29	W61	.931	15454	10.9	33D	-N		P				ET
KANZ	15	1014	1021	1039	S29	W61	.931	15454	10.9	25	-N		C				U
MEUD	15	1015	1017	1030	S30	W60	.928	15454	10.9	15	-N		C				E
ABST	15	1015	1017	1025	S30	W61	.933	15454	10.9	10	1F		C	1017	166		EJ
TEHR	15	1020E	1023U	1037	S27	W65	.947	15454	10.6	17D	-B	2	C		159		F
GRP68623	15	1051+1	1052+1	1059	N16	W68	.921	15451	10.4	8	-F						DG
ABST	15	1051	1053	1058	N17	W70	.933	15451	10.2	7	-F		C	1053	87		D
KANZ	15	1052	1052	1100	N16	W67	.914	15451	10.4	8	-F		C				G
624 ZURI	15	1106	1110	1112	N46	E32	.744	15471	17.9	6	-F		C	1110	80	1.3	Y5
625 ZURI	15	1242	1246	1250	S32	W65	.956	15454	10.7	8	-F		C	1246	40		Y5
626 KANZ	15	1328	1328	1328	N44	E31	.721	15471	17.9		-B		C				D Y5
627 KANZ	15	1506	1506	1514	S31	W65	.954	15454	10.8	8	-B		C				D Y5
GRP68628	15	1547+1	1548+2 1558	1611	S28	W64	.944	15454	10.9	24	-N				25		F
MCMA	15	1547E		1610	S31	W65	.954	15454	10.8	23D	-N		C	1553			E
RAMY	15	1547	1548	1607	S28	W62	.934	15454	11.0	20	-B	3	C		28		F
HOLL	15	1547	1550	1611	S29	W65	.950	15454	10.8	24	-N	3	C		24		F
KANZ	15	1548	1558	1612	S28	W63	.939	15454	10.9	24	-B		C				
GRP68629	15	1621+0	1621+2	1626	N43	E32	.719	15471	18.1	5	-N						
KANZ	15	1621	1621	1626	N43	E33	.726	15471	18.2	5	-N		C				
RAMY	15	1621	1623	1625	N44	E31	.721	15471	18.0	4	-N	3	C		18		
630 KANZ	15	1645	1653	1701	S32	W70	.974	15454	10.4	16	-N		C				Y5
GRP68631	15	1827+3	1836+0	1855	N36	E58	.870	15472	20.1	28	-N				70	1.5	
RAMY	15	1827	1836	1854	N36	E58	.870	15472	20.1	27	-B	3	C		54		FDE
MCMA	15	1828E		1832D	N31	E66	.914	15472	20.7	4D	1N		C	1831	100	2.4	E
HOLL	15	1830	1836	1855	N39	E57	.870	15472	20.0	25	-N	3	C		55		F
	15	2102	2118	NO FLARE PATROL													
	15	2121	2203	NO FLARE PATROL													
632 PALE	15	2205	2214	2221	S35	W88	1.001	15470	9.3	16	-N	3	C		18		F Y5
	15	2241	2244	NO FLARE PATROL													
633 CULG	16	0413	0420	0446	N32	W38	.68E	0	13.3	33	-F		C	0420	40	.6	Y5
634 CULG	16	0532	0552	0609	S26	W85	1.000	15454	9.9	37	-N		C	0552	40		F Y5
GRP68635	16	0552	0619 0629	0642	N45	E31	.729	15471	18.6	50	-N						KU
CULG	16	0552	0619	0627D	N43	E32	.719	15471	18.6	35D	-N		C	0619	100	1.4	K
ISTA	16	0600E		0645	N45	E31	.729	15471	18.6	45D	-N						K
TEHR	16	0621	0629	0639	N45	E27	.706	15471	18.3	18	-N	2	C		127		U
GRP68636	16	0640E	0642	0700	S30	W74	.984	15454	10.7	20	-N						
ISTA	16	0640E		0710D	S33	W75	.988	15454	10.7	30D	-N						
TEHR	16	0641E	0642U	0650	S27	W73	.979	15454	10.8	9D	-B	2	C		63		
637 KHAR	16	0930E	0930	1003D	S26	W76	.986	15454	10.7	33D	-F		P	0933	80		D Y5
GRP68638	16	1324+6	1337+1	1406	S26	W76	.986	15454	10.9	42	1N				110		
KANZ	16	1324E	1338	1407	S26	W74	.981	15454	11.0	43D	-B		C				
HOLL	16	1326	1337	1406	S28	W76	.988	15454	10.9	40	-B	3	C		70		F
LVOV	16	1330	1337	1405	S25	W78	.990	15454	10.7	35	1F		C	1337	150		E
639 HURB	16	1340E	1344	1415D	S14	E58	.876	15477	20.9	35D	?N		V				D Y5
	IMP-1 NO ‡ KANZ2 KIEV1 LVOV1 HOLL1																

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.		
	AUG																	
640 MCMA	16	1533E		1545	N44	E17	.645	15471	17.9	12D	-N		C	1538	25	.3	EHY	Y5
GRP68641	16	1729+1	1732+0	1736	N44	E15	.637	15471	17.9	7	-F				25	.3	E	
HOLL	16	1729	1732	1736	N45	E17	.657	15471	18.0	7	-N	3	C		21			
MCMA	16	1730	1732	1736	N44	E14	.633	15471	17.8	6	-F		C	1732	30	.3	E	
642 PALE	16	2029	2030	2034	N44	E14	.633	15471	17.9	5	-N	3	C		22		DE	Y5
GRP68643	17	0005	0006+0	0010	S14	E56	.860	15477	21.2	5	-N				40	.8	F	
PALE	17	0005	0006	0009	S15	E56	.862	15477	21.2	4	-N	3	C		47		F	
HOLL	17	0006E	0006U	0010D	S14	E57	.868	15477	21.3	4D	-N	2	C		29			
644 PALE	17	0055E	0055U	0057D	N20	W33	.568	15467	14.6	2D	-N	3	C		27		F	Y5
GRP68645	17	0343+0	0345+0	0359	N44	E10	.620	15471	17.9	16	-B				120	1.5	FR	
TEHR	17	0343	0345	0357	N45	E10	.633	15471	17.9	14	-B	2	C		127		R	
MANI	17	0343	0345	0359	N44	E10	.620	15471	17.9	16	-N	3	C		80	1.0		
PALE	17	0345E	0345U	0405D	N44	E10	.620	15471	17.9	20D	-B	3	C		143		F	
646 PALE	17	0345E	0345U	0405D	N20	W34	.581	15467	14.6	20D	-N	3	C		50		F	Y5
647 KHAR	17	0808E	0842	0905D	N18	W90	.999	15451	10.6	57D	-F		V	0840			HT	Y5
648 KHAR	17	0811E		0841D	S23	W90	1.001	15454	10.6	30D	-F		V	0816			DH	Y5
649 KHAR	17	0826E		0920D	N21	W38	.635	15467	14.5	54D	-F		P	0848	120	1.6	E	Y5
650 KHAR	17	0947E		1020D	N18	W90	.999	15451	10.7	33D	-N		P	0947			HT	Y5
GRP68651	17	1323+5	1333 1350	1430D	S30	E40	.800	15476	20.6	67	1N						LU	
MCMA	17	1323	1350	1520	S30	E40	.800	15476	20.6	117	1N		C	1350	150	2.5	ELU	
ZURI	17	1323	1341	1341D	S28	E40	.787	15476	20.6	18D	1N		P	1341	160	2.8		
LVOV	17	1328	1333	1430	S32	E40	.812	15476	20.6	62	-F		C	1333	100	1.8	D	
652 MCMA	17	1408	1412	1419	N46	E06	.638	15471	18.0	11	-F		C	1412	30	.4	E	Y5
653 MCMA	17	1451	1452	1500	N46	E06	.638	15471	18.1	9	-F		C	1452	30	.4	EL	Y5
654 MCMA	17	1524	1528	1543	N46	E06	.638	15471	18.1	19	-N		C	1528	30	.4	EL	Y5
655 MCMA	17	1619	1621	1645	N23	W41	.677	15467	14.6	26	-F		C	1621	50	.7	E	Y5
	17	1748	1758	NO FLARE PATROL														
GRP68656	17	1905+2	1909+2	1920	N38	E35	.701	15472	20.4	15	-N				30	.4		
MCMA	17	1905	1909	1920D	N37	E38	.719	15472	20.6	15D	-N	*	C	1909	30	.4	E	
HOLL	17	1907	1911	1919	N39	E32	.685	15472	20.2	12	-9	*	C		27		FDE	
GRP68657	17	1906+1	1907+2	1914	N45	E04	.622	15471	18.1	8	-N				40	.5		
MCMA	17	1906	1909	1915	N45	E12	.638	15471	18.7	9	-N		C	1909	30	.4	E	
HOLL	17	1907	1908	1913	N45	E04	.622	15471	18.1	6	-N	3	C		71		FDE	
PALE	17	1907	1907U	1911D	N44	E03	.607	15471	18.0	4D	-N	3	C		30		DE	
GRP68658	17	1937+6	1945+0	1954	S19	E47	.798	15477	21.3	17	-N				50	.8	E	
MCMA	17	1937	1945	1952D	S22	E48	.820	15477	21.4	15D	-N		C	1945	70	1.2	E	
PALE	17	1943	1945	1954	S17	E47	.790	15477	21.3	11	-N	3	C		35		DE	
	17	2007	2023	NO FLARE PATROL														
	17	2212	2215	NO FLARE PATROL														
	17	2317	2326	NO FLARE PATROL														
	17	2346	2354	NO FLARE PATROL														
GRP68659	18	0714+1	0719+0	0732	S19	E39	.723	15477	21.2	18	-N				50	.7	DK	
ISTA	18	0714E		0730D	S19	E41	.742	15477	21.4	16D	-N						K	
BUCA	18	0715	0719	0733	S19	E38	.713	15477	21.2	18	-N		C	0719	53	.8	D	
TEHR	18	0717E	0719U	0731	S20	E39	.729	15477	21.2	14D	-N	2	C		63			
GRP68660	18	0739	0739	0755	N29	E71	.940	0	23.6	16	-F							
KANZ	18	0739	0739	0754	N29	E69	.930	0	23.5	15	-F		C					
ISTA	18	0740E		0755D	N30	E73	.951	0	23.8	15D	-N							
661 KANZ	18	0838	0841	0845	S19	E35	.683	15477	21.0	7	-B		C				D	Y5

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OBSERV-ATORY	OBSERVED UT				LOCATION					DURA-TION	IMPOR-TANCE	OBS.		MEASUREMENTS			REMARKS
	DATE AUG	START	MAX PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONF.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
GRP68662	18	0918+4	0924+2	0937	S17	E35	.669	15477	21.0	19	-N				100	1.3	DHU
KHAR	18	0918E	0924	0937D	S17	E36	.679	15477	21.1	19D	-N		P	0922	100	1.4	DH
ZURI	18	0920	0926	0940	S17	E35	.669	15477	21.0	20	-N		C	0926	120	1.7	
MONT	18	0922	0926	0930	S18	E35	.676	15477	21.0	8	-F		C	0926	50		D
KANZ	18	0922	0925	0936	S17	E35	.669	15477	21.0	14	-B		C				U
GRP68663	18	1030+4	1035+3	1042	S17	E35	.669	15477	21.1	12	-N				80	1.1	DH
KHAR	18	1030E	1035	1042	S17	E36	.679	15477	21.1	12D	-N		P	1038	100	1.4	DH
ZURI	18	1034	1038	1042	S17	E35	.669	15477	21.1	8	-N		C	1038	60	.8	
664 KHAR	18	1048E	1050	1101	S20	E34	.680	15477	21.0	13D	-N		P	1057	90	1.3	DH Y5
665 KHAR	18	1106E	1106	1110	S21	E37	.716	15477	21.2	4D	-F		V	1108			DH Y5
GRP68666	18	1112E	1118+8	1138	S18	E34	.665	15477	21.0	26	-N				70	.9	EHK
KHAR	18	1112E	1118	1128	S16	E34	.651	15477	21.0	16D	1N		V	1118			DE
RAMY	18	1119E	1123U	1137	S17	E35	.669	15477	21.1	18D	-B	2	C		75		H
MCMA	18	1123E		1130	S18	E33	.655	15477	20.9	7D	-N		C	1123	50	.7	DH
ZURI	18	1124	1124	1130	S17	E34	.658	15477	21.0	6	-N		C	1124	80	1.1	
KHAR	18	1124	1126	1137	S21	E34	.687	15477	21.0	13	-F		V	1126			DH
MCMA	18	1130		1204D	S20	E40	.738	15477	21.5	34D	-N		C	1133	100	1.5	EK
KHAR	18	1136E		1138	S18	E34	.665	15477	21.0	2D	-F		V	1136			DH
GRP68667	18	1145+7	1154+3	1209	S19	E40	.732	15477	21.5	24	-N				70	1.0	H
KHAR	18	1145E	1154	12100	S20	E43	.767	15477	21.7	25D	1F		P	1157	200	3.1	H
RAMY	18	1149	1157	1215	S17	E38	.700	15477	21.3	26	-B	3	C		55		F
ZURI	18	1152	1157	1205	S18	E42	.746	15477	21.6	13	-N		C	1157	70	1.1	
KHAR	18	1204E		1207D	S21	E34	.687	15477	21.1	3D	-F		V	1204			DH
668 RAMY	18	1237	1242	1333	S17	E38	.700	15477	21.4	56	-B	3	C		62		F Y5
GRP68669	18	1346+4	1352+0	1402	S16	E34	.651	15477	21.1	16	-N						FH
RAMY	18	1346	1352	1358	S16	E35	.662	15477	21.2	12	-B	3	C		46		F H
ZURI	18	1350	1352	1406	S17	E33	.648	15477	21.1	16	1F		C	1352	260	3.6	
GRP68670	18	1418+1	1420+4	1434	S18	E35	.676	15477	21.2	16	-N				50	.7	FH
ZURI	18	1418	1420	1428	S17	E33	.648	15477	21.1	10	-N		C	1420	60	.8	
RAMY	18	1419	1420	1434	S17	E35	.669	15477	21.2	15	-B	3	C		38		F H
ZURI	18	1422	1424	1434	S21	E36	.706	15477	21.3	12	-N		C	1424	70	1.1	
671 PALE	18	1929	1941	1954	S18	E34	.665	15477	21.4	25	-N	3	C		46		DE Y5
	18	2143	2150	NO FLARE PATROL													
	18	2226	2302	NO FLARE PATROL													
	18	2332	2359	NO FLARE PATROL													
672 KANZ	19	1516	1520	1522	S21	E22	.577	15477	21.3	6	-F		C				Y5
673 PALE	19	1852	1907	1914	S18	E21	.535	15477	21.4	22	-N	3	C		47		DE Y5
	19	2058	2059	NO FLARE PATROL													
	19	2103	2125	NO FLARE PATROL													
	19	2128	2150	NO FLARE PATROL													
	19	0232	0237	NO FLARE PATROL													
	19	0239	0244	NO FLARE PATROL													
	19	0310	0315	NO FLARE PATROL													
	19	0411	0418	NO FLARE PATROL													
	19	0007	0019	NO FLARE PATROL													
674 CULG	19	2336	2343	2355	N17	W76	.964	15467	14.3	19	-F		C	2343	40		Y5
	20	0139	0200	NO FLARE PATROL													
	20	0203	0208	NO FLARE PATROL													
	20	0051	0052	NO FLARE PATROL													
675 CULG	20	0523	0534U	0536	S22	E11	.512	15477	21.0	13	-N		P	0534	30	.3	Y5
676 KHAR	20	1010E	1016	1032D	N20	W80	.979	15467	14.4	22D	-N		V	1016			D Y5
677 KHAR	20	1125E		1147D	N18	W88	.998	15467	13.9	22D	-F		V	1125			D Y5
GRP68678	20	1307+6	1313+1	1320	N21	W79	.976	15467	14.6	13	-F						
KANZ	20	1307	1314	1321	N23	W78	.972	15467	14.7	14	-F		C				
RAMY	20	1313	1313	1318	N20	W80	.979	15467	14.6	5	-N	3	C		10		
679 RAMY	20	1647	1647	1650	N20	W81	.982	15467	14.6	3	-N	3	C		9		Y5

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS			REMARKS
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		COND	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
	AUG																
680 PALE	21	0239	0240	0243	S18	E06	.432	15477	21.6	4	-N	3	C		42		DE Y5
681 RAMY	21	1450	1451	1459	S18	W04	.426	15477	21.3	9	-N	3	C		22		Y5
682 HOLL	21	1728	1738	1757	S27	W18	.617	15476	20.4	29	-N	3	C		63		F Y5
683 MCMA	21	1811E		1812D	N24	W90	.999	15467	15.0	1D	-F		P	1811			Y5
684 CULG	21	2155	2200	2220	S20	E60	.905	15487	26.4	25	-F		C	2200	30	.7	Y5
GRP68685	22	0759+0	0801+4	0814	S18	W13	.470	15477	21.4	15	-F				70	.8	E
MEUD	22	0759	0801	0815	S19	W13	.484	15477	21.4	16	-F		C				E
MONT	22	0759	0805	0814	S18	W13	.470	15477	21.4	15	-N		C	0805	80		E
ZURI	22	0804E	0804	0810	S18	W12	.463	15477	21.4	6D	-F		P	0804	70	.8	
686 KANZ	22	0905	0909	0915	S20	W14	.504	15477	21.3	1D	-F		C				Y5
687 ABST	22	1029E	1029	1036	S18	W14	.477	15477	21.4	7D	-F		P	1029	87	1.0	EJ Y5
GRP68688	22	1349+0	1353+0	1356	N21	W05	.257	15478	22.2	7	-N				25	.3	FG
HOLL	22	1349	1353	1356	N21	W09	.285	15478	21.9	7	-F	2	C		34		F
KANZ	22	1349	1353	1356	N21	W04	.252	15478	22.3	7	-N		C				FG
MCMA	22	1350E		1351D	N22	W05	.273	15478	22.2	1D	-N		P	1351	20	.2	D
689 ZURI	22	1526	1530	1552	S19	E43	.762	15485	25.9	26	-F		C	1530	60	1.0	Y5
690 MCMA	22	1935	1945	2000	S18	E63	.920	15490	27.5	25	-N		C	1945	20	.6	D Y5
	22	2056	2124	NO FLARE PATROL													
	22	2223	2232	NO FLARE PATROL													
691 CULG	23	0220	0236U	0300	S20	E32	.662	15485	25.5	4D	-F		C	0236	50	.7	Y5
692 CULG	23	0357	0402	0420	S18	W22	.546	15477	21.5	23	-F		C	0402	70	.8	Y5
GRP68693	23	0710+0		0738	S19	W22	.557	15477	21.6	28	-F						
ISTA	23	0710E		0747D	S20	W21	.559	15477	21.7	37D	-N			0719			F
BUCA	23	0710		0729	S18	W24	.565	15477	21.5	19	-F		C	0716	107	1.3	E
694 KANZ	23	0837	0850	0853D	N18	E90	.999	15493	30.1	16D	-N		C				Y5
695 ZURI	23	0951	0953	1001	S17	W31	.628	15477	21.1	1D	-F		C	0953	60	.8	Y5
GRP68696	23	1524+5	1532+2	1548	S18	W29	.615	15477	21.5	24	-N				70	.9	
RAMY	23	1524	1532	1611	S19	W29	.624	15477	21.5	47	-9	3	C		85		FDE
HOLL	23	1525	1533	1546	S18	W29	.615	15477	21.5	21	-N	3	C		66		
MCMA	23	1525	1534	1552	S18	W31	.636	15477	21.3	27	-N		C	1534	60	.8	E
KANZ	23	1526	1532	1546D	S18	W29	.615	15477	21.5	20D	-N		C				F
ZURI	23	1529	1533	1539	S19	W30	.634	15477	21.4	1D	-N		C	1533	50	.7	
GRP68697	23	1554+1	1557+0	1606	S18	W29	.615	15477	21.5	12	-N				35	.4	E
MCMA	23	1554	1557	1606	S18	W30	.626	15477	21.4	12	-N		C	1557	40	.6	E
HOLL	23	1555	1557	1606	S18	W29	.615	15477	21.5	11	-N	3	C		33		
698 RAMY	23	1635	1635	1646	S21	W30	.651	15477	21.4	11	-N	3	C		40		Y5
GRP68699	23	1745+1	1748	1758	S19	W30	.634	15477	21.5	13	-N				50	.6	
MCMA	23	1745		1800	S18	W30	.626	15477	21.5	15	-N		C	1746	40	.5	E
RAMY	23	1746	1748	1756	S21	W30	.651	15477	21.5	10	-N	3	C		74		FDE
	23	2051	2114	NO FLARE PATROL													
700 CULG	23	2203	2208	2219	S20	E48	.813	15490	27.5	16	-F		C	2208	30	.5	Y5
701 CULG	23	2247	2254	2313	S17	W38	.702	15477	21.1	26	-F		C	2254	20	.3	Y5
GRP68702	23	2355+2	2359+1	0012	S18	E44	.767	15490	27.3	17	-F				50	.8	
VORO	23	2355	2359	0008	S17	E46	.781	15490	27.4	13	-N		C	2359	45	.7	
CULG	23	2357	2400	0015	S19	E43	.763	15490	27.2	18	-F		C	2400	60	1.0	
703 CULG	24	0021	0024	0043	S19	E22	.557	15485	25.7	22	-F		C	0024	40	.5	Y5
GRP68704	24	0029+0	0033+4	0102	N20	W26	.475	15478	22.1	33	-N				60	.7	D
VORO	24	0029	0033	0058	N20	W26	.475	15478	22.1	29	-N		C	0033	81	.9	D
CULG	24	0029	0037	0105	N21	W26	.481	15478	22.1	36	-N		C	0037	40	.5	

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	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		CONF.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
	AUG																
GRP68705	24	0031+6	0039+3	0102	S17	E45	.772	15490	27.4	31	-F		C		80	1.2	EH
CULG	24	0031	0042	0110	S19	E44	.772	15490	27.3	39	-F		C	0042	60	1.0	
VORO	24	0037	0039	0053	S16	E46	.777	15490	27.5	16	-N		C	0039	108	1.7	EH
706 VORO	24	0148	0151	0159	S17	E46	.782	15490	27.5	11	-N		C	0151	54	.8	D Y5
707 TEHR	24	0311	0315	0347	N11	E68	.922	15494	29.2	36	-F	2	C		31		Y5
708 TEHR	24	0602	0604	0636	S16	E42	.737	15490	27.4	34	-N	2	C		95		F H Y5
GRP68709	24	0937+2	0940	0951	S16	W44	.758	15477	21.1	14	-F						D
KHAR	24	0937E		0948D	S16	W46	.777	15477	21.0	110	-F		V				D
MONT	24	0939	0940	0951	S16	W43	.748	15477	21.2	12	-F		C	0940	50		D
	24	1345	1415	NO FLARE PATROL													
	24	1424	1515	NO FLARE PATROL													
	24	1545	1609	NO FLARE PATROL													
	24	1659	1729	NO FLARE PATROL													
	24	1742	1800	NO FLARE PATROL													
710 RAMY	24	1823	1823	1843	S16	E36	.674	15490	27.5	20	-N	3	C		18		Y5
711 RAMY	24	1933	1933	1945	S16	E35	.664	15490	27.4	12	-N	3	C		18		Y5
	24	2115	2121	NO FLARE PATROL													
712 CULG	24	2354	2354	0014	S18	W55	.864	15477	20.9	20	-N		C	2354	20	.4	Y5
713 ABST	25	0728E	0733	0745	S19	E29	.625	15490	27.5	17D	-F		P	0733	140	1.8	EJ Y5
GRP68714	25	1154+9	1209+3	1222	S16	E26	.567	15490	27.4	28	-N				130	1.6	
RAMY	25	1154	1209	1230	S16	E26	.567	15490	27.4	36	-B	3	C		109		FDE
ZURI	25	1207	1209	1219	S17	E27	.587	15490	27.5	12	-N		C	1209	100	1.3	
LVOV	25	1210E	1212	1222	S16	E26	.567	15490	27.5	12D	1F		C	1212	180	2.3	E
715 MCMA	25	1653	1650	1705	N34	E90	.998	15495	1.5	15	-F		C	1650			Y5
716 MCMA	25	1809	1811	1817	N34	E90	.998	15495	1.5	8	-F		C	1811			Y5
	25	2023	2051	NO FLARE PATROL													
	25	2055	2057	NO FLARE PATROL													
	25	2103	2110	NO FLARE PATROL													
	25	2138	2216	NO FLARE PATROL													
	25	2221	2232	NO FLARE PATROL													
	25	2250	2309	NO FLARE PATROL													
	25	2310	2315	NO FLARE PATROL													
	25	2326	2328	NO FLARE PATROL													
GRP68717	25	2328E	2336	0016	S24	E09	.534	15487	26.7	48	-N						EU
			2352														
CULG	25	2328E	2352	0025	S24	E08	.530	15487	26.6	57D	-N		C	2352	130	1.6	U
MITK	25	2334E	2336	0007	S24	E10	.538	15487	26.7	33D	-N		C	2336			E
	25	2330	2334	NO FLARE PATROL													
718 CULG	25	2349	2349	2353	N13	W77	.970	0	20.2	5	-F		C	2349	20		Y5
	26	1831	1838	NO FLARE PATROL													
	26	0156	0158	NO FLARE PATROL													
	26	0018	0023	NO FLARE PATROL													
	26	0025	0031	NO FLARE PATROL													
GRP68719	26	2110+1	2112+2	2123	N21	E71	.938	15496	2.2	13	-N				50		FU
HOLL	26	2110	2112	2121	N22	E71	.938	15496	1.2	11	-N	3	C		59		U F
PALE	26	2111	2114	2125	N20	E71	.938	15496	1.2	14	-N	2	C		48		F
GRP68720	26	2152+3	2154+1	2213	N21	E70	.933	15496	2.2	21	-N						FU
HOLL	26	2152	2154	2219	N22	E70	.933	15496	1.2	27	-N	3	C		59		U F
PALE	26	2155	2155	2206	N20	E71	.938	15496	1.2	11	-N	3	C		23		F
721 HOLL	26	2308	2334	0003	N22	E69	.927	15496	1.1	55	-B	3	C		22		U F Y5
722 CULG	26	2332	2352U	0032	N18	E78	.933	15496	1.2	60	-F		C	2352	30		Y5
723 PALE	27	0306	0313	0316	N20	E68	.920	15496	1.2	10	-N	3	C		24		F Y5
724 CULG	27	0415	0417	0425	N22	W68	.920	15478	22.1	10	-F		C	0417	30	.8	Y5

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS			REMARKS
	DATE (AUG)	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP. DAY	MIN.		COND	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg.	
725 CULG	27	0443	0453	0503	N18	E68	.920	15496	1.3	15	-N		C	0453	60		T Y5
726 CULG	27	0516	0525	0550	S19	W35	.685	15504	24.6	34	-N		C	0525	40	.6	Y5
727 MITK	27	0724E	0729	0739	N19	E67	.914	15496	1.3	15D	1N		C	0729	180		Y5
	27	1100	1110	NO FLARE PATROL													
	27	1115	1125	NO FLARE PATROL													
GRP68728	27	1126>9	1131	1140D	N20	E62	.877	15496	2.1	14	-F						
KANZ	27	1126E	1131	1140	N20	E63	.885	15496	1.2	14D	-F		C				T
RAMY	27	1136	1205	1211	N20	E62	.877	15496	1.1	35	-N	3	C		30		
	27	1152	1202	NO FLARE PATROL													
729 RAMY	27	1214	1217	1319	N20	E62	.877	15496	1.2	65	-B	3	C		109		Y5
	27	1247	1311	NO FLARE PATROL													
	27	1315	1335	NO FLARE PATROL													
730 KANZ	27	1359	1410	1418	N20	E64	.893	15496	1.4	19	-B		C				Y5
731 RAMY	27	1417	1418	1422	S22	W38	.734	15504	24.7	5	-N	3	C		22		Y5
732 HOLL	27	1545	1548	1551	N23	E61	.871	15496	1.2	6	-B	3	C		32		FDE Y5
GRP68733	27	1559+2	1625+2 1633	1657	N20	E60	.861	15496	2.2	58	-B						F
HOLL	27	1559	1625	1657	N23	E60	.863	15496	1.2	58	-B	3	C		128		F
KANZ	27	1601	1627	1655	N20	E62	.877	15496	1.3	54	-B		C				
RAMY	27	1631	1633	1659	N20	E59	.853	15496	1.1	28	-B	3	C		38		
GRP68734	27	1701+0	1709 1719	1729	N21	E59	.853	15496	2.1	28	-N						F
RAMY	27	1701	1709	1728	N20	E59	.853	15496	1.1	27	-N	3	C		22		
HOLL	27	1701	1719	1730	N23	E60	.863	15496	1.2	29	-N	3	C		48		F
GRP68735	27	1841+4	1847+3	1905	N22	E58	.846	15496	2.1	24	-B				35	.7	F
HOLL	27	1841	1847	1910	N23	E59	.855	15496	1.2	29	-B	3	C		45		
PALE	27	1845	1850	1900	N21	E58	.845	15496	1.1	15	-B	3	C		22		F
GRP68736	27	1940+1	1944+1	1955	N11	E19	.328	15494	29.2	15	-B				140	1.5	F
HOLL	27	1940	1944	1951	N11	E21	.360	15494	29.4	11	-B	3	C		132		
PALE	27	1941	1945	1959	N11	E18	.312	15494	29.2	18	-B	3	C		145		F
GRP68737	27	2036+1	2038+1	2055	N22	E57	.837	15496	2.1	19	-B				100	1.9	F
HOLL	27	2036	2038	2054	N23	E58	.847	15496	1.2	18	-B	3	C		113		
PALE	27	2037	2039	2055	N21	E57	.836	15496	1.1	18	-B	3	C		89		F
738 HOLL	27	2308	2313	0003	N22	E69	.927	15496	2.1	55	-F	3	C		45		U F Y5
GRP68739	27	2327+3	2333+1	0001	N20	E57	.835	15496	2.3	34	-N				70	1.3	FJ
CULG	27	2327	2333	0005	N18	E58	.843	15496	1.3	38	-F		C	2333	70	1.3	J
HOLL	27	2330	2334	2357	N23	E56	.829	15496	1.2	27	-B	3	C		70		F
GRP68740	28	0208+3	0214+3	0314	N10	E13	.228	15494	29.1	66	-B				70	.7	U
PALE	28	0208E	0217U	0235D	N11	E15	.264	15494	29.2	27D	-N	3	C		87		U F
MITK	28	0208	0217	0232D	N10	E13	.228	15494	29.1	24D	-B		C	0217			E
CULG	28	0211	0214	0314	N09	E13	.225	15494	29.1	63	-B		C	0214	60	.6	U
741 CULG	28	0248	0253	0310	N18	E57	.834	15496	1.4	22	-F		C	0253	30	.5	Y5
GRP68742	28	0336+7	0349+2	0420	N19	E56	.825	15496	2.3	44	-F						E
CULG	28	0336	0349	0430	N18	E57	.834	15496	1.4	54	1F		C	0349	140	2.5	
MITK	28	0343	0351	0409	N20	E56	.826	15496	1.4	26	-F		C	0351			E
GRP68743	28	0754	0757 0815+6	0845D	N18	E54	.805	15496	2.4	51	-N						FJ
ABST	28	0754	0757	0824D	N16	E54	.804	15496	1.4	30D	-F		P	0757	105	1.8	FJ
KHAR	28	0804E	0815	0845D	N18	E54	.805	15496	1.4	41D	-N		P	0840	100	1.8	C
HURB	28	0819E	0821	0830D	N18	E44	.697	15496	31.6	11D	1N		V				
744 KHAR	28	1024E	1029	1035D	N16	E90	.999	15508	4.2	11D	-N		P	1033	80		DH Y5
745 KHAR	28	1047E	1048	1054D	N16	E24	.424	15493	30.2	7D	-F		V	1049			D Y5
746 KHAR	28	1124E	1130	1136D	N29	E58	.854	15495	1.8	12D	-F		V	1130			DH Y5

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OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Millionths of Disk	CORR. AREA Sq. Deg.		
	AUG																	
GRP68747	28	1559+6	1606+1	1613	N10	E06	.115	15494	29.1	14	-B		C		70	.7		
RAMY	28	1559	1607	1644	N10	E06	.115	15494	29.1	45	-B	4	C		54		FDE	
ZURI	28	1601	1607	1613	N10	E06	.115	15494	29.1	12	-N		C	1607	90	1.0		
HOLL	28	1605	1606	1613	N10	E09	.163	15494	29.3	8	-B	3	C		80		F	
GRP68748	28	1707+1	1707+1	1720	N10	E05	.100	15494	29.1	13	-N				50	.5	F	
RAMY	28	1707	1707	1722	N10	E05	.100	15494	29.1	15	-B	4	C		35			
PALE	28	1708	1708	1718	N11	E06	.123	15494	29.2	10	-N	3	C		62		F	
	28	2022	2041	NO FLARE PATROL														
	28	2053	2119	NO FLARE PATROL														
749 HOLL	29	0047	0048	0052	S25	W31	.696	15487	26.7	5	-N	2	C		21		F	Y5
750 VORO	29	0138	0141	0151	N20	E46	.724	15496	1.5	13	-N		C	0141	108	1.5	E	Y5
GRP68751	29	0730>9		0936	N11	W54	.803	15502	25.3	126	-F						D	
ISTA	29	0730E		0900D	N10	W53	.793	15502	25.3	90D	-F						B	
WEND	29	0842		0936	N12	W55	.813	15502	25.2	54	-F		V				D	
752 KHAR	29	0945E		1018D	S26	E82	.998	15509	4.6	33D	?F		P	0945	120		H	Y5
	IMP.1 NO ZURI2			CATA1	ABST1													
GRP68753	29	0958+3	1009	1015	N10	E81	.985	15508	5.5	17	-F						D	
KHAR	29	0958E		1016D	N08	E80	.982	15508	4.4	18D	-F		V	1007			D	
ZURI	29	1001	1009	1013	N12	E82	.987	15508	4.6	12	-F		C	1009		.5		
754 RAMY	29	1241	1243	1251	N17	E78	.972	15508	4.4	10	-F	3	C					Y5
GRP68755	29	1412+1	1414+1	1433	S31	E79	.995	15509	5.5	21	-N						E	
RAMY	29	1412	1414	1432	S30	E79	.995	15509	4.5	20	-F	4	C					
KANZ	29	1412	1415	1434	S31	E78	.994	15509	4.4	22	-B		C					
ZURI	29	1413	1415	1433	S33	E90	1.002	15509	5.3	20	1F		C	1415	180		E	
GRP68756	29	1531+2	1536+1	1543	N16	E77	.969	15508	5.4	12	-F						E	
KANZ	29	1531		1538	N16	E77	.969	15508	4.4	7	-F		C					
RAMY	29	1532	1537	1546	N17	E77	.968	15508	4.4	14	-N	4	C					
MCMA	29	1533	1536	1543	N14	E80	.980	15508	4.6	10	-F		C	1536			E	
757 RAMY	29	1717	1717	1735	S25	W57	.899	15504	25.4	18	-N	4	C		13			Y5
GRP68758	29	1802+1	1804+0	1810	N16	E77	.969	15508	5.5	8	-N							
MCMA	29	1802	1804	1809	N15	E80	.980	15508	4.8	7	-N		C	1804			D	
RAMY	29	1803	1804	1811	N17	E75	.959	15508	4.4	8	-B	4	C		19		FDE	
759 RAMY	29	1913	1913	1925	N17	E75	.959	15508	4.4	12	-F	4	C		9		FDE	Y5
760 RAMY	29	1933	1933	1941	N17	E74	.955	15508	4.4	8	-F	4	C		10		FDE	Y5
GRP68761	29	2025+0	2033	2047	N16	E77	.969	15508	5.6	22	-N							
MCMA	29	2025		2029D	N15	E80	.980	15508	4.9	4D	-N		P	2025			E	
RAMY	29	2025	2033	2047	N17	E74	.955	15508	4.4	22	-N	3	C		17		FDE	
	29	2038	2055	NO FLARE PATROL														
	29	2100	2111	NO FLARE PATROL														
	29	2121	2135	NO FLARE PATROL														
	29	2143	2146	NO FLARE PATROL														
762 CULG	30	0416	0418	0425D	S21	W78	.989	15504	24.3	9D	-B		C	0418	40			Y5
763 CULG	30	0418	0421	0425D	N15	E70	.933	15508	4.4	7D	-F		P	0421	30			Y5
764 TEHR	30	0534E	0537	0546	N15	E74	.955	15508	4.8	12D	-N	2	C		95			Y5
GRP68765	30	0601+3	0607+0	0618	S22	E56	.884	15507	4.5	17	-F						D	
ABST	30	0601	0607	0620	S22	E55	.877	15507	3.4	19	-F		C	0607	87	1.8	D	
CULG	30	0604	0607	0616	S22	E57	.891	15507	3.5	12	-F		C	0617	40	.9		
766 ABST	30	0638	0640	0648	N15	E72	.945	15508	4.7	10	?F		C	0640	157		E	Y5
	IMP.1 NO CATA1																	
767 TEHR	30	0734E	0737	0746	N15	E74	.955	15508	4.9	12D	-N	2	C		95			Y5
768 ISTA	30	0759		0809D	N19	E71	.938	15508	4.7	10D	-F						Z	Y5
769 ABST	30	1050E	1051	1056	N15	E72	.945	15508	4.9	6D	-F		P	1051	61		D	Y5

Hα SOLAR FLARES

AUGUST 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS	
	DATE	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONG	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg		
770 RAMY	30	1137	1200	1249	N19	E65	.899	15508	4.4	72	-B	4	C		33		FDE	Y5
771 RAMY	30	1145	1157	1217	S27	E70	.969	15509	4.7	32	-B	3	C		37		FDE	Y5
772 RAMY	30	1148	1148	1204	N35	E33	.658	15495	2.0	16	-N	3	C		19			Y5
773 RAMY	30	1309	1309	1324	S25	W67	.954	15504	25.5	15	-N	4	C		14			Y5
774 RAMY	30	1338	1340	1344	N19	E65	.899	15508	4.4	6	-B	4	C		44			Y5
GRP68775	30	1418+0	1419+0 1437	1442	N18	E65	.899	15508	5.5	24	-B				45			
RAMY	30	1418	1419	1440	N19	E64	.892	15508	4.4	22	-B	4	C		40		FDE	
HOLL	30	1418	1419	1427	N18	E67	.913	15508	4.6	9	-B	3	C		50			
HOLL	30	1431	1437	1444	N18	E66	.906	15508	4.6	13	-B	3	C		19			
776 RAMY	30	1510	1512	1522	S27	E68	.962	15509	4.7	12	-N	4	C		13			Y5
GRP68777	30	1530+4	1544+0	1703	N18	E65	.899	15508	5.5	93	1B				190		FU	
RAMY	30	1503	1544	1702	N19	E64	.892	15508	4.4	119	1B	*	C		180		F	
HOLL	30	1530	1544	1545D	N18	E66	.906	15508	4.6	15D	1B	*	C		214		U F	
HOLL	30	1530	1548	1703	N18	E65	.899	15508	4.5	93	1B	*	C		191		U F	
RAMY	30	1534	1544	1550D	N19	E64	.892	15508	4.4	16D	1B	*	V		180			
MCMA	30	1606E		1611D	N15	E66	.907	15508	4.6	5D	-N	*	P	1606	40	1.0	E	
778 RAMY	30	1727	1727	1732	N19	E63	.885	15508	4.5	5	-N	4	C		13			Y5
GRP68779	30	1741+5	1746+0	1811	N18	E63	.884	15508	5.5	30	-B				25	.6	F	
HOLL	30	1741	1746	1803	N18	E65	.899	15508	4.6	22	-B	3	C		27			
RAMY	30	1746	1746	1819	N19	E62	.877	15508	4.4	33	-B	3	C		19		F	
GRP68780	30	1832	1838+0	1901	N18	E63	.884	15508	5.5	29	-B				25	.6		
HOLL	30	1832	1838	1856	N18	E64	.892	15508	4.6	24	-B	3	C		31			
PALE	30	1837E	1838	1905D	N18	E63	.884	15508	4.5	28D	-B	3	C		23		FDE	
781 HOLL	30	1908	1908	1918	S30	E72	.979	15509	5.2	10	-N	3	C		8			Y5
GRP68782	30	1909+2	1914+1	1926	N18	E63	.884	15508	5.5	17	-N				15	.3		
PALE	30	1909E	1915U	1933D	N18	E63	.884	15508	4.5	24D	-N	3	C		14		DE	
HOLL	30	1911	1914	1918	N18	E64	.892	15508	4.6	7	-N	3	C		19		FDE	
783 HOLL	30	2040	2045	2051	S30	E72	.979	15509	5.3	11	-N	3	C		18			Y5
784 PALE	30	2131	2131	2135	S30	E67	.962	15509	4.9	4	-N	3	C		21		DE	Y5
GRP68785	30	2213+4	2217+1	2222	S30	E71	.976	15509	6.3	9	-N				50		D	
HOLL	30	2213	2217	2224	S30	E71	.976	15509	5.3	11	-N	3	C		46			
VORO	30	2215E		2221	S31	E71	.977	15509	5.3	6D	-N		C	2217	45		CD	
PALE	30	2217	2218	2222	S30	E67	.962	15509	5.0	5	-N	3	C		48		DE	
GRP68786	30	2238+1	2243+0	2252	S30	E70	.973	15509	6.2	14	-B				60		D	
HOLL	30	2238	2243	2256	S30	E70	.973	15509	5.2	18	-B	2	C		70			
VORO	30	2239	2243	2248	S31	E71	.977	15509	5.3	9	-B		C	2243	45		D	
GRP68787	30	2313+3	2317+0	2322	S30	E68	.966	15509	6.1	9	-N				20			
HOLL	30	2313	2317	2322	S30	E70	.973	15509	5.2	9	-N	2	C		19			
PALE	30	2316	2317	2322	S30	E66	.958	15509	4.9	6	-N	3	C		21		DE	
788 PALE	30	2316	2319	2337	N17	E60	.860	15508	4.5	21	-N	3	C		47		DE	Y5
GRP68789	30	2331+1	2337 2345	2349	S30	E68	.966	15509	6.1	18	-N							
HOLL	30	2331	2345	2352	S30	E70	.973	15509	5.2	21	-N	2	C		24			
PALE	30	2332	2337	2346	S30	E66	.958	15509	4.9	14	-N	3	C		16		DE	
790 PALE	31	0137	0139	0144	S30	E65	.954	15509	4.9	7	-N	3	C		48		DE	Y5
791 TACH	31	0431E	0440	0450D	N16	E58	.842	15508	4.5	19D	1N		C	0440	136	2.6	E	Y5
GRP68792	31	0526+1	0531+2	0603	N15	E57	.832	15508	5.5	37	1N				180	3.3	EJ	
TACH	31	0526E	0531	0542D	N15	E55	.813	15508	4.4	16D	1N		C	0531	178	3.3	E	
TEHR	31	0527	0533	0603	N17	E57	.833	15508	4.5	36	-B	2	C		95		F	
ABST	31	0528E	0531	0552D	N14	E59	.850	15508	4.7	24D	1N		P	0531	244	4.8	EJ	
793 ABST	31	0630	0635	0638D	N15	W14	.272	15493	30.2	8D	-F		P	0635	96	1.0	D	Y5
794 ABST	31 IMP.1	0640E NO	0641 CATA1	0651	N12	W85	.994	15502	24.9	11D	?F		P	0641	79		D	Y5

Hα SOLAR FLARES

AUGUST 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS		MEASUREMENTS			REMARKS
	DATE AUG	START	MAX. PHASE	END	APPROX LAT.	APPROX MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMR DAY	MIN.		CONC	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR AREA Sq. Deg	
795 ABST	31	0653	0655	0658	N14	E60	.859	15508	4.8	5	?F		C	0655	140	2.8	DJ Y5
	IMP.1 NO 3 CATA1																
796 KHAR	31	0727E		0750D	S26	E90	1.001	15518	7.1	23D	-F		P	0727			DH Y5
797 ABST	31	0754	0800	0807	N13	E59	.850	15508	4.8	13	-F		C	0800	87	1.6	DJ Y5
798 KHAR	31	1009	1010	1027	N14	E58	.841	15508	4.8	18	?N		P	1014	160	3.2	HL Y5
	IMP.1 NO 3 CATA1																
799 KHAR	31	1022E	1025	1031D	S19	E88	1.000	15518	7.0	9D	-N		V	1025			DH Y5
800 KHAR	31	1144E	1146	1153	N14	E58	.841	15508	4.8	9D	-F		V	1146			DH Y5
GRP68801	31	1306+0	1306+5	1343	N09	W32	.526	15494	29.1	37	-N				35	.4	EU
RAMY	31	1306	1306	1343	N10	W32	.526	15494	29.1	37	-B	4	C		23		U
MCMA	31	1306	1311	1325D	N09	W33	.540	15494	29.1	19D	-N		C	1311	45	.6	E
802 RAMY	31	1324	1328	1345	N21	E08	.273	15496	1.2	21	-N	4	C		51		Y5
803 UPIC	31	1400E		1435D	S25	E90	1.001	15518	7.3	35D	?B		P	1400			Y5
	IMP.2 NO 3 RAMY1																
804 MCMA	31	1548	1550	1606D	N20	E00	.268	15496	31.7	18D	-N		C	1550	75	.8	E Y5
804 RAMY	31	1548	1549	1607	N21	E07	.266	15496	1.2	19	-B	4	C		64		FDE Y5
804 HOLL	31	1549	1551	1605	N22	E06	.274	15496	1.1	16	-B	3	C		90		F Y5
GRP68805	31	1626+7	1633	1726	S30	E61	.935	15509	6.3	60	1B				160		FU
			1701+1														
HOLL	31	1626	1701	1730	S30	E61	.935	15509	5.3	64	1B	*	C		177		U F
RAMY	31	1633	1633	1652	S27	E55	.893	15509	4.8	19	-N	*	C		13		F
RAMY	31	1657	1702	1726	S27	E55	.893	15509	4.8	29	1B	*	C		154		
RAMY	31	1657	1702	1726	S27	E55	.893	15509	4.8	29	1B	*	C		154		
MCMA	31	1709E		1718	S33	E61	.942	15509	5.3	10D	-N	*	C	1708	50	1.5	E
GRP68806	31	1629	1629	1643	N21	E07	.266	15496	2.2	14	-N						F
RAMY	31	1629	1629	1643	N21	E07	.266	15496	1.2	14	-N	4	C		21		F
807 RAMY	31	1900	1900	1902D	N18	E49	.753	15508	4.5	2D	-N	3	C		18		Y5
808 PALE	31	2129	2143	2157	N18	E42	.673	15508	4.0	28	-N	3	C		38		FDE Y5
GRP68809	31	2154+2	2156+1	2204	S22	E32	.680	15507	4.3	10	-N				60	.8	
VORO	31	2154	2157	2203	S22	E32	.680	15507	3.3	9	-N		C	2157	63	.8	D
MCMA	31	2154	2156	2205D	S22	E31	.671	15507	3.2	11D	-N		C	2156	50	.7	E
CULG	31	2155	2156	2205	S22	E29	.652	15507	3.1	10	-N		C	2156	60	.8	
HOLL	31	2156E	2157U	2206	S20	E32	.664	15507	3.3	10D	-N	2	C		54		F
PALE	31	2156	2157	2202	S21	E33	.681	15507	3.4	6	-N	3	C		57		
810 PALE	31	2222	2237	2242	N17	E48	.741	15508	4.5	20	-N	3	C		134		DE Y5
GRP68811	31	2250+1	2253+1	2308	N16	E48	.740	15508	5.6	18	-N				90	1.4	D
PALE	31	2250	2254	2318	N17	E48	.741	15508	4.6	28	-B	3	C		128		DE
VORO	31	2251	2253	2257	N15	E48	.739	15508	4.6	6	-N		C	2253	63	.9	D
812 PALE	31	2321	2354	0006	N17	E47	.730	15508	4.5	45	-N	3	C		22		DE Y5

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

AUGUST 1978

DAILY FLARE INDICES
Includes all Flares

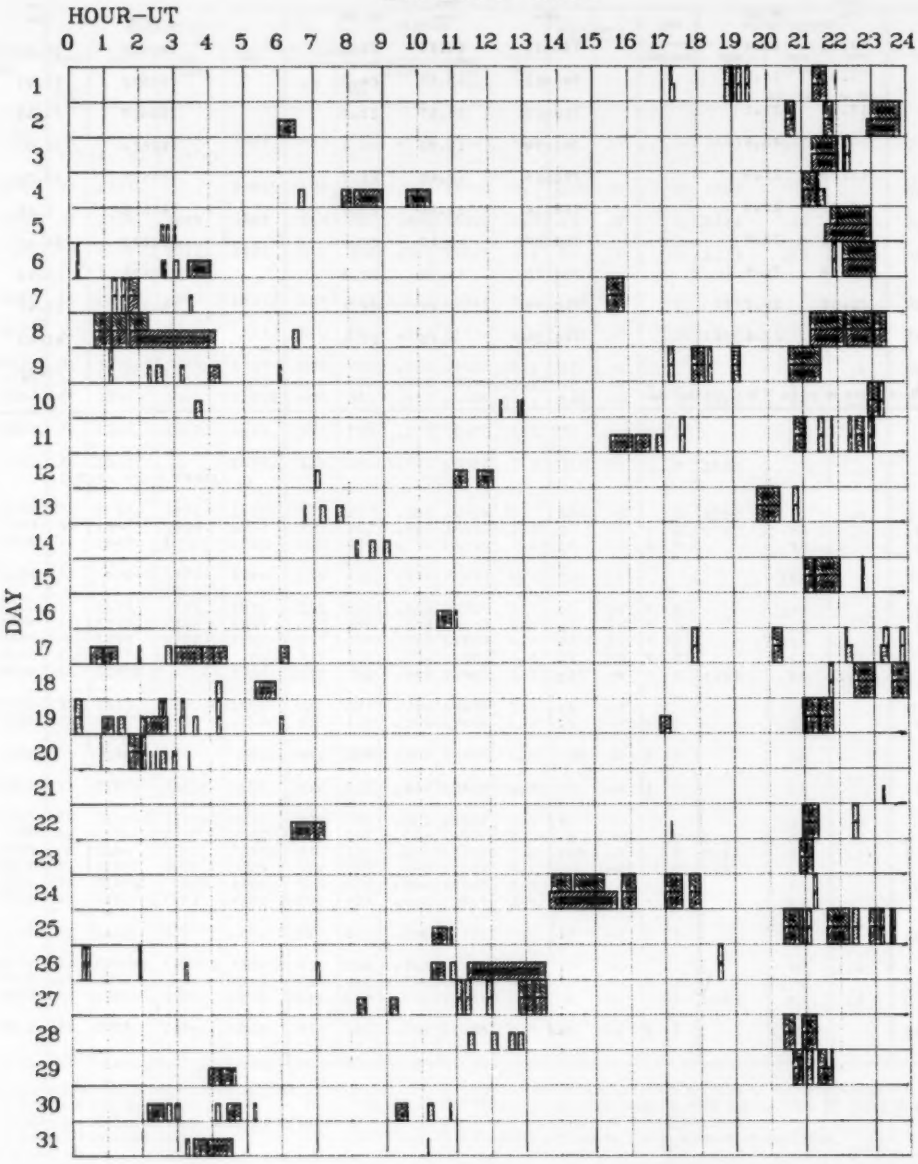
Date	Flare Index	HR. OBS	Date	Flare Index	HR. OBS.	Date	Flare Index	HR. OBS.
780801	6.76	23.1	780811	59.16	22.9	780821	15.62	24.0
780802	0.00	22.6	780812	40.85	24.0	780822	12.57	23.4
780803	13.75	23.1	780813	26.47	23.2	780823	24.45	23.6
780804	15.42	23.6	780814	18.80	24.0	780824	20.57	21.3
780805	19.26	22.9	780815	43.60	23.0	780825	18.34	22.1
780806	8.29	23.0	780816	19.80	24.0	780826	3.85	23.7
780807	19.42	23.0	780817	46.13	23.2	780827	34.82	22.8
780808	11.18	20.5	780818	29.22	22.8	780828	19.58	23.3
780809	21.68	22.2	780819	7.81	22.7	780829	13.55	23.3
780810	41.28	23.6	780820	6.79	23.6	780830	41.43	24.0
						780831	79.87	24.0

When no Flare Index is given, it is 0 for that day.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

AUGUST 1978



Observatories included in total patrol:

Abastumani	Herstmonceux	Kandilli	Lvov	Monte Mario	Upice
Athenes	Holloman	Kanzelhohe	Manila	Palehua	Voroshilov
Bucharest	Huancayo	Kharkov	McMath-Hulbert	Ramey	Wendelstein
Catania	Hurbanovo	Kiev	Meudon	Tashkent	Zurich
Culgoora	Istanboul	Locarno	Mitaka	Tehran	

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

AUGUST 1978

AUG 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} MEAN	INT	POLARIZATION OR REMARKS
1	245	SGMR	44 NS	0939 E	1014.3	860 D	16.7			
	410	SGMR	43 NS	1445	1455.4	355	33.7			
	260	ONDR	41 F	1017.5	1018.5	8	8			
	930	BORD	41 F	1117.2	1117.3	.4	63	2		
	202	IZMI	7 C	1120.3	1120.5	.7	67	30		
	33	UPIC	3 S	1120.5	1120.7	.5				
	29	UPIC	8 S	1120.6	1120.9	.4				
	260	ONDR	2 S/F	1130.6	1130.6	.4	25			
	2800	OTTA	240 R	2035	2300	145	3.6	1.5		
2	260	ONDR	43 NS	0749		371	32			
	237	TRST	41 F	1752.7	1752.7	.3	210			5L
3	260	ONDR	41 F	0708	0718.2	15	18			
	260	ONDR	41 F	0905	0918.2	13	7			
	245	SGMR	44 NS	0942 E	1543	854 D	35.4			
	536	ONDR	3 S	1105.7	1105.7	.2	24			
	536	ONDR	1 S	1116.3	1116.3	.2	11			
	930	BORD	8 S	1559.5	1559.5	.3	25	2		
	2695	BOUL	40 F	1840	1841.5	6.5	9	3		
	2695	PENT	240 R	2310	2400	50	2.2	.8		
4	260	ONDR	3 S	0725.2	0725.2	.2	12			
	260	ONDR	45 C	0945.6	0948	3	25	16		
	29	UPIC	4 S/F	0956.6	0956.9	.7				
	33	UPIC	4 S/F	0956.8	0956.8	.6				
	536	ONDR	3 S	1312.8	1312.8	.2	21			
	2800	OTTA	40 F	1335.5	1338.9	6.5	13.2			
	930	BORD	41 F	1342.6	1342.7	.3	22	2		
	930	BORD	41 F	1352.3	1352.3	.6	11	2		
	930	BORD	41 F	1412.1	1412.3	.3	12	2		
	9400	HUAN	20 GRF	1554.1	1605.7	11.6	6.4	2.6		0
	930	BORD	41 F	1624	1625.1	2	17	2		
	2800	OTTA	8 S	1625	1625	.1	2.2			
	9400	HUAN	1 S	1736.4	1739	2.6	9.6	3.4		R
5	260	ONDR	43 NS	0610		510	32			
	245	SGMR	43 NS	1345	1355.8	610 D	33			
	410	SGMR	43 NS	1345	1355.8	610 D	11.2			
	3100	CRIM	24 R	0727	1031		3			
	536	ONDR	3 S	1355	1355	.2	20			
6	2695	BOUL	2 SF	0115.5	0116.5	2.5	5	2		
	260	ONDR	44 NS	0610 E		540 D	13			
	3100	CRIM	1 S	0618	0623	5	3	1		
	3100	CRIM	24 R	0845	1052		3			
	2800	OTTA	1 S	1251.5	1252	3	5.6	1.9		
	2695	BOUL	1 S	1252	1252.5	1	3	1		
	2800	OTTA	27 RF	1955		265	2.2	1.9		
	2800	OTTA	24 R	1955	2045	50	2.2	1.1		
	2800	OTTA	24P R	2045		195	2.2			
	2695	PENT	26 FAL	2400	2410	20	-2.2	-1.1		
7	2650	DWIN	41 F	0920	0934	17	40	5		
	2800	OTTA	20 GRF	1228	1303	65	2	1.6		
	2800	OTTA	240 R	1335	1350	15	2	1		
	9400	HUAN	3 S	1347.2	1349.8	2.6	19.2	8.3		0
	9400	HUAN	20 GRF	1402	1416.4	14.4	9.6	3.4		0
	2800	OTTA	20 GRF	1425	1432	12	2	1		
	2800	OTTA	240 R	1500	1545	45	3.2	1.6		
	2800	OTTA	21 GRF	1705	1753	85	2.4	1.2		
	4995	BOUL	4 SF	1753.5	1754.5	3	19	6		
	1415	SGMR	3 S	1754.5	1755.5	6.5	21.9	8.8		2
	606	SGMR	3 S	1754.5	1758.5	4.9	20.2	8.1		2
	8800	SGMR	3 S	1754.7	1755	7	27	10.8		2
	2800	OTTA	4 S/F	1754.8	1755.1	5	29	10		
	410	SGMR	6 S	1754.8	1758.5	4.8	83.6	33.4		2
	245	SGMR	49 GB	1754.8	1755.2	24.2	2117	847		2
	4995	SGMR	3 S	1754.8	1755.1	4.7	24	9.6		2
	7000	SAOP	2 F	1754	1755.2	39.4				
	2695	SGMR	3 S	1755	1755.3	10.4	18.6	7.5		2
	2695	BOUL	4 SF	1755	1755.5	3	30	10		
	930	BORD	45 C	1756.5	1757.1	3.5	27	9		
	2695	PENT	21 GRF	2110	2325	250	7	2.7		
	2695	PENT	8 S	2310.5	2310.5	.1	2.2			
	4995	BOUL	4 SF	2312.5	2314.5	5 D	109	36		
	8800	MANI	3 S	2313.6	2315.6	3.6	131.5	43.8		
	2695	MANI	3 S	2313.9	2315.2	2.4	32.7	10.9		
	2695	PENT	3 S	2313	2315.5	7	23.4	5.2		
	2695	BOUL	4 SF	2314	2316	4.5	19	6		
	1415	MANI	3 S	2313.9	2315.3	2.4	2.5	.8		
	4995	MANI	3 S	2314.2	2315.5	5.6	85.3	28.4		
8	260	ONDR	44 NS	0610 E		544 D	18			

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	245	SGMR	44 NS	0946 E	1733.5	845 D	20			
	9100	ARCE	40 F	0943.7	0944	7.5				
	536	ONDR	8 S	1149.3	1149.3	.3	49			
	536	ONDR	8 S	1208.6	1208.6	.3	58			
	9400	HUAN	20 GRF	2022.7	2039.4	16.7	6.7	4.7		0
9	260	ONDR	41 F	0611	0634	39	10			
	9400	HUAN	8 S	1218	1218.7	.7	28.8	13.1		0
	9400	HUAN	20 GRF	1355.6	1408.7	13.1	5.1	3.2		0
	260	ONDR	8 S	1410.8	1410.8	.4	32			
	2800	OTTA	20 GRF	1535	1610	240	6.2	3.1		
	2800	OTTA	1 S	2146	2148	8	1.6	.8		
10	2800	OTTA	20 GRF	1325	1328	13	2.6	1.3		
	2800	OTTA	20 GRF	1540	1550	20	1.8	.9		
	2800	OTTA	20 GRF	1740	1755	30	1.4	.7		
	2800	OTTA	20 GRF	1940	1952	15	1.6	.8		
	245	SGMR	6 S	1945	1945.5	3.2	45.6	18.2		
	410	SGMR	6 S	1946.8	1946.9	.3	13.6	5.4		
	245	SGMR	7 C	2044.2	2048.8		45.6			
	245	SGMR	7 C	2044.2	2044.5	6.1	284	114		
	245	SGMR	43 NS	2050.3	2135.5	177.7D	62.2			
11	29	UPIC	2 S/F	0704.7	0705	.6				
	33	UPIC	2 S/F	0704.9	0704.9	.2				
	260	ONDR	43 NS	0718		332	30			
	127	TORN	43 NS	1230 U	1303	150 D	120	2.9		V=1
	237	TRST	41 F	0717.6	0717.7	.1	257			8L
	237	TRST	41 F	0927.3	0927.5	.5	96			0
	237	TRST	5 S	0929.8	0929.8	.1	111	37		3L
	260	ONDR	46 C	0940.5	0945	5	145	128		UNCERTN
	2800	OTTA	20 GRF	1211.5	1212	18	3	1		
	113	POTS	48 C	1224.2	1228.7	4.7	400	15		
	410	SGMR	6 S	2024.3	2025.2	1.1	42.4	17		
12	260	ONDR	41 F	0725	0732	39	11			
	3100	CRIM	24 R	0730	0900		14			
	260	ONDR	3 S	1117.3	1117.3	.3	15			
	260	ONDR	41 F	1228	1230.5	6.5	30			
	260	ONDR	42 SER	1415	1418.3	4	17	6		
	18	MCMA	6 S	1601	1608	16			1	
	2800	OTTA	1 S	2121.8	2123	4	1.2	.6		
13	2800	OTTA	24 R	1103	1126	23	2.6	1.3		
	2800	OTTA	27 RF	1103		178	2.6	1.8		
	2800	OTTA	24P R	1126		59	2.6			
	9100	ARCE	2 S/F	1219.7	1220.2	3.3				
	8800	ATHN	20 GRF	1224.4	1225	12.1	16	9.6		
	2800	OTTA	26 FAL	1225	1353	88	-2.6	-1.3		
	9100	ARCE	1 S	1339.6	1340	1.5				
	1420	ARCE	8 S	1339.6	1340	.8				
	1420	BERL	3 S	1340	1340.2	.5	11			
	2800	OTTA	24 R	1425	1455	30	2.2	1.1		
	2800	OTTA	27A RF	1425		485	2.2	2		
	2800	OTTA	24P R	1455		405	2.2			
	2800	OTTA	27 RF	1731		134	2	1.7		
	2800	OTTA	24 R	1731	1733	2	2	1		
	2800	OTTA	24P R	1733		97	2			
	2800	OTTA	26 FAL	1910	1945	35	-2	-1.2		
	9400	HUAN	20 GRF	2106	2113.2	7.2	15.1	7.1		R
	2800	OTTA	26 FAL	2140	2230	50	-1.8	-.9		
14	2695	PENT	1 S	0816.3	0817	2	3.6	1.8		
	3100	CRIM	20 GRF	0814	0912	114	5	2		
	260	ONDR	3 S	1000.7	1000.7	.2	20			
	260	ONDR	45 C	1051.8		1.5	40	29		
	9400	HUAN	1 S	1228	1233	5	5	2.1		R
	260	ONDR	41 F	1350.4	1350.4	2.5	47			
	260	ONDR	2 S/F	1453.8	1453.8	.4	13			
	2800	OTTA	1 S	1618	1618.9	2	2	.7		
	2800	OTTA	22 GRF	1730	1855	225	3.8	2.2		
	7000	SAOP	2 F	1734	1738	26.3		13		
	9100	ARCE	1 S	1737.5	1738.1	1.2				
	2695	PENT	26 FAL	2350	2430	40	-2.2	-1.1		
15	9100	ARCE	4 S/F	0951.3	0951.6	.8				
	113	POTS	45 C	0958	0958.1	.5	200	60		
	9100	ARCE	1 S	1006.2	1006.4	.7				
	8800	ATHN	4 S/F	1013.1	1015.6	13.4	50	15		
	4995	ATHN	3 S	1013.2	1015.5	19.1	24.8	7.4		
	10400	BERN	4	1013.6	1015.4	19	50			
	9100	ARCE	21 GRF	1013	1023.8	21.5				
	9500	BERL	2 S/F	1014.5	1015.6	21	43			
	3000	BERL	1 S	1014.5	1016.5	3.5	4.5			
	9100	ARCE	3 S	1014.6	1015.5	2.9				

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	2695	ATHN	20 GRF	1014.6	1023.7	19.4	3.3	2		
	10715	OWIN	3 S	1014	1015	3	50	20		
	1415	ATHN	20 GRF	1016.4	1024.9	18.2	5.1	3.1		
	260	ONDR	43 NS	1215		180	64	12		
	2800	OTTA	20 GRF	1330	1550	240	5.6	3		
	7000	SAOP	3 S	1534.6		8				
	9400	HUAN	20 GRF	1545.2	1608.6	23.4	8.4	3.4		0
	2800	OTTA	20 GRF	1825	1839	35	3.4	1.6		
	9400	HUAN	20 GRF	1922.7	2017.5	54.8	6.7	3.4		0
	2800	OTTA	20 GRF	1925	1950	95	2.2	1.1		
	2695	PENT	20 GRF	2200	2300	90	2.2	1.1		
16	3100	GRIM	1 S	0634	0635	4	3	1		
	260	ONDR	46 C	0802	0810	9	14	6.3		
	245	SGMR	44 NS	1030 E	1729.5	570 D	221.6			
	410	SGMR	44 NS	1030 E	1518.6	570 D	12			
	8400	BERN	23	1203.2	1205.2	5	17			OPR
	10400	BERN	23	1203.2	1205.2	5	8 U			OPR
	8900	BERN	23	1203.2	1205.2	5	14			OPR
	7000	SAOP	2 F	1203.4	1205.2	13.7		9		
	9500	BERL	22 GRF	1203	1205	13	11			
	930	BORD	8 S	1204.6	1204.6	.2	21	2		
	7000	SAOP		1307.4	1332.7	33.3		14		
	7000	SAOP		1307.4	1327.4	27.4		9		
	7000	SAOP	45 C	1307.4						2 COMPONENTS
	2800	OTTA	21 GRF	1322	1325	78	4			
	9100	ARCE	21 GRF	1323.8	1332.9	25				
	9400	HUAN	21 GRF	1323.8	1402.4	38.6	11.3	4.4		0
	10400	BERN	23	1324.3	1327.7	11	9 U			OPR
	8900	BERN	23	1324.3	1327.7	11	20			OPR
	8400	BERN	23	1324.3	1327.7	11	25			OPR
	9500	BERL	22 GRF	1326	1333	39	15			
	9400	HUAN	3 S	1327	1328.5	1.5	13	6.5		0
	3000	BERL	22 GRF	1330	1333.5	25	5.4			
	2800	OTTA	1 S	1330	1333.5	5	3.2	1.5		
	9400	HUAN	1 S	1331.8	1334.8	3	9.7	6.3		R
	237	TRST	41 F	1729.4	1729.4	.6	341			7L
	2800	OTTA	20 GRF	1955	2035	155	2.8	1.4		
17	202	IZMI	41 F	0607.5	0609.8	3.5	130			
	260	ONDR	43 NS	0804		396	29			
	245	SGMR	43 NS	1412	1430.3	348 D	117			
	410	SGMR	43 NS	1412	1650.4	348 D	70.4			
	2800	OTTA	21 GRF	1310		270	4.4	2.2		
	113	POTS	21 SF	1437.2	1438.4	2.6	350	20		
	237	TRST	41 F	1437.3	1438.2	1.6	360			14R
	930	BORD	45 C	1438.5	1438.5	.5	25	2		
	237	TRST	41 F	1622.9	1623	.3	440			18R
	2800	OTTA	1 S	1630.5	1632	5	1.4	.7		
	2800	OTTA	21 GRF	1903	1955	180	5	2.5		
	2800	OTTA	1 S	1935	1937	9	3.6	1.7		
18	237	TRST	42 SER	0923.4	0925.3	2.4	107			2R
	33	UPIC	4 S/F	1017.3	1017.7	.8				
	29	UPIC	4 S/F	1017.3	1017.8	.6				
	29	UPIC	8 S	1024.1	1024.3	.4				
	33	UPIC	8 S	1024	1024.1	.4				
	29	UPIC	8 S	1028.8	1029.3	.5				
	33	UPIC	8 S	1029	1029.1	.2				
	237	TRST	42 SER	1033.9	1033.9	3.2	134			5R
	237	TRST		1033.9	1036.8		628			0
	234	POTS	21 S/F	1034.6	1037.7	4.6	350	10		
	113	POTS	21 S/F	1034.8	1035.2	3.3	140	5		
	408	TRST	42 SER	1034.8	1037.7	4.3	110 D			
	410	SGMR	6 S	1034.9	1038	4.4	151	45.3		
	606	SGMR	3 S	1034.9	1038	3.6	49.2	14.8		
	245	SGMR	7 S	1034.9	1038	4.4	298	89.4		
	930	BORD	46 C	1036.4	1037.7	1.6	24	3		
	2800	OTTA	21 GRF	1115	1243	360	3.2	1.6		
	2800	OTTA	20 GRF	1154	1156	20	2	1		
	410	SGMR	43 NS	1305	1439	415 D	34			
	245	SGMR	43 NS	1305	1350.2	415 D	53.9			
	9400	HUAN	20 GRF	1924.8	1948	23.2	6.8	3.3		0
20	29	UPIC	4 S/F	1002.3	1002.4	.2				
	33	UPIC	2 S/F	1002	1002.1	.3				
	260	ONDR	2 S/F	1011.3	1011.8	1	15			
21	260	ONDR	42 SER	1359.3	1414.2	26	21			
	2800	OTTA	20 GRF	1705	1800	175	3.6	2		
22	260	ONDR	42 SER	1003	1020.5	18	50			
	8800	ATHN	3 S	1156	1156.9	7.7	28.6	17.1		
	260	ONDR	42 SER	1235	1235.5	80	54			
	9400	HUAN	20 GRF	1319.9	1425.6	65.7	7.8	3.4		R

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	245	SGMR	43 NS	1353.1	1735.5	366.9D	99.1			3
	260	ONDR	8 S	1456	1456	.3	32			
	2800	OTTA	20 GRF	1525	1550	35	1.4	.7		
	9100	ARCE	40 F	1528.6	1530.1	3.8				
	9400	HUAN	1 S	1911.3	1913.7	2.4	6.3	2.2		R
	9400	HUAN	1 S	1937	1938.3	1.3	7.8	2.4		0
	2800	OTTA	240 R	2147	2150	3	1.2	.6		
23	260	ONDR	43 NS	0807	1205	343	175			
	245	SGMR	43 NS	1125.5	1158.2	514.5D	49.5			
	410	SGMR	43 NS	1125.5	1249.8	514.5D	28.5			
	2800	OTTA	20 GRF	1120	1250	330	4.2	2.1		
	113	POTS	45 C	1126.8	1127.5	1.4	100	15		
	536	ONDR	4 S/F	1225.3	1226	1.5	62			
	29	UPIC	45 C	1613.1	1613.9	1.1				
	33	UPIC	45 C	1613.4	1614.1	.8				
24	1420	ARCE	20 GRF	0910.3	0940.4	84				
	29	UPIC	4 S/F	0911.1	0911.4	1.1				
	33	UPIC	45 C	0911.3	0911.4	3.9				
	536	ONDR	8 S	0924.7	0924.7	.3	78			
	260	ONDR	2 S/F	0940	0940.6	2	10	2.4		
	9100	ARCE	1 S	0951.4	0951.6	1.2				RECORDDISTURBED
	9100	ARCE	1 S	1032.2	1032.5	.7				
	9100	ARCE	1 S	1114.2	1114.4	.6				
	2800	OTTA	20 GRF	1727	1810	110	1.2	.7		
25	234	POTS	45 C	1025.3	1025.6	.4	125	25		
	2800	OTTA	20 GRF	1200	1207	90	3.6	1.2		
	260	ONDR	42 SER	1318.3	1319.7	71	24	2		
	245	SGMR	43 NS	1419	1423	341 D	55			
	237	TRST	42 SER	1420.5	1422	2.9	260			17R
	536	ONDR	3 S	1439.2	1439.2	.2	27			
	245	SGMR	7 S	1534.9	1542.6	11.1	388	92.4		3
	237	TRST	42 SER	1541.2E	1542.5	2.7D	770			0
	237	TRST		1541.2E	1543.8		127			0
	9400	HUAN	22 GRF	1938.2	2029	50.8	11.5	3.9		R
26	245	SGMR	44 NS	1030 E	1724	570 D	26.4			
27	3100	CRIM	26 C	0834	0928		5			
	3100	CRIM		0915	0926					
	3100	CRIM	45 C	0915	0920.5	7	4	1		
	808	ONDR	45 C	0918.6	0925.4	7.5	70	11		
	1420	ARCE	4 S/F	0918.7	0919.5	2				
	3000	BERL	1 S	0919	0919.8	1.5	4.6			
	1470	BERL	4 S/F	0919	0919.9	1.5	28			
	9100	ARCE	20 GRF	0919.4	0925.5	32				
	1420	ARCE	1 S	0924.8	0925.1	1.8				
	3000	BERL	1	0925	0925.3	3.5	4.6			
	1470	BERL	4 S/F	0925	0925.4	1.2	7.2			
	9400	HUAN	20 GRF	1159	1222.5	23.5	6.8	3.7		0
	2800	OTTA	240 R	1237	1357	80	2.8	1.4		
	260	ONDR	45 C	1244	1246.3	6	14	1		
	2800	OTTA	20 GRF	1545	1725	175	5.2	3.3		
	9400	HUAN	20 GRF	1624	1817	113	10.2	4.3		R
	2800	OTTA	27A RF	1924		135	1.2	1		
	2800	OTTA	24 R	1924	1946	22	1.2	.6		
	2800	OTTA	1 S	1944	1945.3	2.5	2.2	.8		
	2800	OTTA	24P R	1946		96	1.2			
	2800	OTTA	2 S/F	2037	2037.5	5	5.4	1.8		
	2695	BOUL	45 C	2038	2038	2	3	1		
	2800	OTTA	26 FAL	2122	2139	17	-1.2	-.6		
28	2800	OTTA	240 R	1455	1500	5	1.6	.8		
	2800	OTTA	20 GRF	1545	1640	115	1.8	.9		
	1420	BOUL	1 S	1715.5	1716	1.5	2			
	4995	BOUL	45 C	1830	1833.5	6.5	12	4		
29	606	MANI	3 S	0252.4	0252.8	1.8	6	3		
	1415	MANI	3 S	0252.4	0252.9	2.2	19.6	6.5		
	4995	MANI	3 S	0252.5	0253	2.6	27.3	9.1		
	2695	MANI	3 S	0252.5	0252.9	2.5	41.6	13.5		
	5730	IRKU	1 S	0252	0252.8	4	26			R
	8800	MANI	3 S	0253.3	0252.9	1.5	8.5	3.6		
	3100	CRIM	24 R	0734	0910		7			
	9100	ARCE	1 S	1015.5	1015.7	.5				
	9100	ARCE	20 GRF	1048.1	1114.2	75				
	4995	BOUL	2 SF	1410.5	1411.5	2	10	3		
	3000	BERL	4 S/F	1411	1412.6	4	13			
	1470	BERL	3 S	1411	1412.7	4	7.8			
	8400	BERN	22	1411.1	1411.8	3	13 U			
	10400	BERN	22	1411.1	1411.8	3	8 U			
	8900	BERN	22	1411.1	1411.8	3	12 U			
	1420	BOUL	2 SF	1411	1412	2.5	6	2		

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	2650	DWIN	3 S	1411	1413	3	15	10		
	7000	SAOP	1 F	1412.2	1412.8	7.5		100		
	2695	BOUL	4 SF	1412	1413	3	13	4		
	2800	OTTA	1 S	1801	1801.2	1	1.4	.7		
	9400	HUAN	3 S	1803.1	1805.2	2.1	15.2	4.5		R
	7000	SAOP	2 F	1803.4	1804.8	13.4		43		
	2695	PENT	240AR	2005	2030	25	2.2	1.1		
	2695	PENT	1 S	2024.5	2026.5	3.5	4	2		
	2695	BOUL	2 SF	2026 E	2027.5	3 D	4	1		
30	260	ONDR	44 NS	0606 E		546 D	16			
	3100	CRIM	1 S	0725	0726	3	3	1		
	9400	HUAN	1 S	1217.2	1222.6	5.4	8.4	3.4		R
	9400	HUAN	20 GRF	1240.4	1248	7.6	6.7	3.5		R
	9400	HUAN	20 GRF	1337.7	1403.2	25.5	10.1	5.9		0
	2800	OTTA	2 S/F	1339	1340	7	3	1		
	9400	HUAN	1 S	1433.3	1435.7	2.4	8.4	2.7		R
	2800	OTTA	240 R	1440	1510	30	2.6	1		
	8900	BERN	46	1536	1538.3	54	68			
	8400	BERN	46	1536	1538.3	54	70			
	10400	BERN	46	1536	1542.9	54	119			
	8900	BERN	46	1536	1542.9	54	169			
	8400	BERN	46	1536	1542.9	54	162			
	10400	BERN	46	1536	1538.3	54	53			
	4995	SGMR	3 S	1536.5	1544	26.5	167	66.8		SWF
	7000	SAOP	45 C	1536.5	1545.1	177.8		16		COMPLEX 4 COMP
	4995	ATHN	4 S/F	1536.6	1544.4	51.9	155	46.5		
	8800	ATHN	4 S/F	1536.7	1542.9	46.2	196	58.8		
	9100	ARCE	21 GRF	1536.8	1551.9	100				
	2800	OTTA	240AR	1536	1800	144	4.4			
	8800	SGMR	3 S	1537	1542.6	26	165	66		SWF
	9400	HUAN	46 C	1537.1	1553.4	16.3	143.3	57.1		R
	1420	ARCE	23 GRF	1537.3	1549.4	80				
	15400	SGMR	3 S	1537.5	1545	25.5	63	25.2		SWF
	1420	BOUL	41 F	1537.5	U	115 D	145	48		
	9100	ARCE	3 S	1537.6	1538.5	3.2				
	1415	SGMR	3 S	1537.8	1543.9	18.2	57	22.8		SWF
	2695	ATHN	4 S/F	1537.8	1544.3	46.7	73.5	22.1		
	4995	BOUL	41 F	1537	1644	116 D	121	40		
	10715	DWIN	47 GB	1537 E		60 D	130			SUNSET
	2650	DWIN	47 GB	1537 E		60 D	130			SUNSET
	2800	OTTA	45 C	1537	1544	23	84	18.6		
	930	BORD	46 C	1537	1544	45	104	10		
	2695	SGMR	3 S	1538	1545.3	25	93	37.2		SWF
	2695	BOUL	41 F	1538.5	1645.5	114.5D	153	51		
	410	SGMR	6 S	1539.5	1547	20.5	87.5	35		SWF
	606	SGMR	3 S	1541.5	1544.8	14.5	82.2	32.9		SWF
	1415	ATHN	3 S	1541.7	1544.1	40.7	44.5	13.4		
	9100	ARCE	4 S/F	1541.8	1542.9	5				
	1420	ARCE	4 S/F	1541.9	1543.7	5				
	245	SGMR	6 S	1543.8	15 9	16.2	12.4	5		SWF
	1420	ARCE	4 S/F	1550.7	1551.6	1.6				
	9400	HUAN	30 PBI	1553.4	1719.4	86	30.3	13.2		R
	410	SGMR	43 NS	1600	1714	240 D	57.5			CONT
	245	SGMR	43 NS	1600	1613.4	240 D	47.4			CONT
	2800	OTTA	30 PBI	1600	1600	115	9.8	4.9		
	1415	SGMR	3 S	1608	1613.7	13.8	21.9	6.6		CONT
	1420	ARCE	40 F	1610.4	1613.4	5				
	2800	OTTA	2 S/F	1610.5	1611.3	2	4.4	2		
	4995	SGMR	3 S	1612.8	1613.6	3.7	11.6	3.5		CONT
	2800	OTTA	3 S	1612.9	1613.5	4	12	3.4		
	2695	SGMR	3 S	1613	1613.7	4.5	10.5	3.2		CONT
	2800	OTTA	1 S	1618.2	1618.7	1.8	2.6	1.3		
	1415	SGMR	45 C	1629.9	1718.7		366			CONT
	1415	SGMR	45 C	1629.9	1643.9	54.1	487	195		CONT
	930	BORD	45 C	1629	1644.7	57	214	30		
	930	BORD	-	1629	1658		287			
	15400	SGMR	20 GRF	1630	1644.5	50.8	48.8	19.5		CONT
	606	SGMR	3 S	1630.2	1640.8	53.8	103	41.2		CONT
	9400	HUAN	45 C	1630.4	1707.6	37.2	114.6	39.4		R
	4995	SGMR	3 S	1630.6	1645	51.4	173	69.2		CONT
	2695	SGMR	3 S	1630.6	1650.3	52.6	166	66.4		CONT
	2800	OTTA	4 S/F	1630	1645	65	170	39		
	8800	SGMR	3 S	1631.2	1644.8	48.1	132	52.8		CONT
	1420	ARCE	4 S/F	1631.5	1643.3	19.5				AT SUNSET
	10400	BERN	4	1633.2	1644.4	60	112			
	8900	BERN	4	1633.2	1644.4	60	103			
	8400	BERN	4	1633.2	1644.4	60	112			
	9100	ARCE	20 GRF	1637.2	1645.1	30.5				AT SUNSET
	1420	ARCE	29 PBI	1651						
	1420	BOUL	1 S	2058.5	2059	1	2			
	2800	OTTA	1 S	2059	2059.5	1	7.6	3		
	2695	BOUL	1 S	2100	2100.5	1	8	3		
31	3100	CRIM	24 R	0648	0805		6			

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

AUGUST 1978

AUG 1978	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY 10^{-22} Wm^{-2} Hz^{-1} PEAK	FLUX DENSITY MEAN	INT	POLARIZATION OR REMARKS
	260	ONDR	44	NS	0654 E		518 D	26			
	245	SGMR	44	NS	1030 E	1240.7	570 D	19.6			2,5
	410	SGMR	44	NS	1030 E	15 6.2	570 D	20			2,5
	2800	OTTA	20	GRF	1300	1350	140	4.4	2.6		
	33	UPIC	2	S/F	1354.1	1354.4	.7				
	29	UPIC	2	S/F	1354.2	1354.6	.7				
	33	UPIC	2	S/F	1407.6	1407.7	1				
	29	UPIC	2	S/F	1407.6	1407.9	.8				
	2800	OTTA	22	GRF	1530	1600	205	4	2		
	1420	BCUL	45	C	1553	1557	5	4	1		
	9400	HUAN	20	GRF	1657.8	1709	11.2	6.7	4.2		0
	2800	OTTA	22	GRF	1920	2035	160	4.6	2.6		

Reports received from the following observatories:

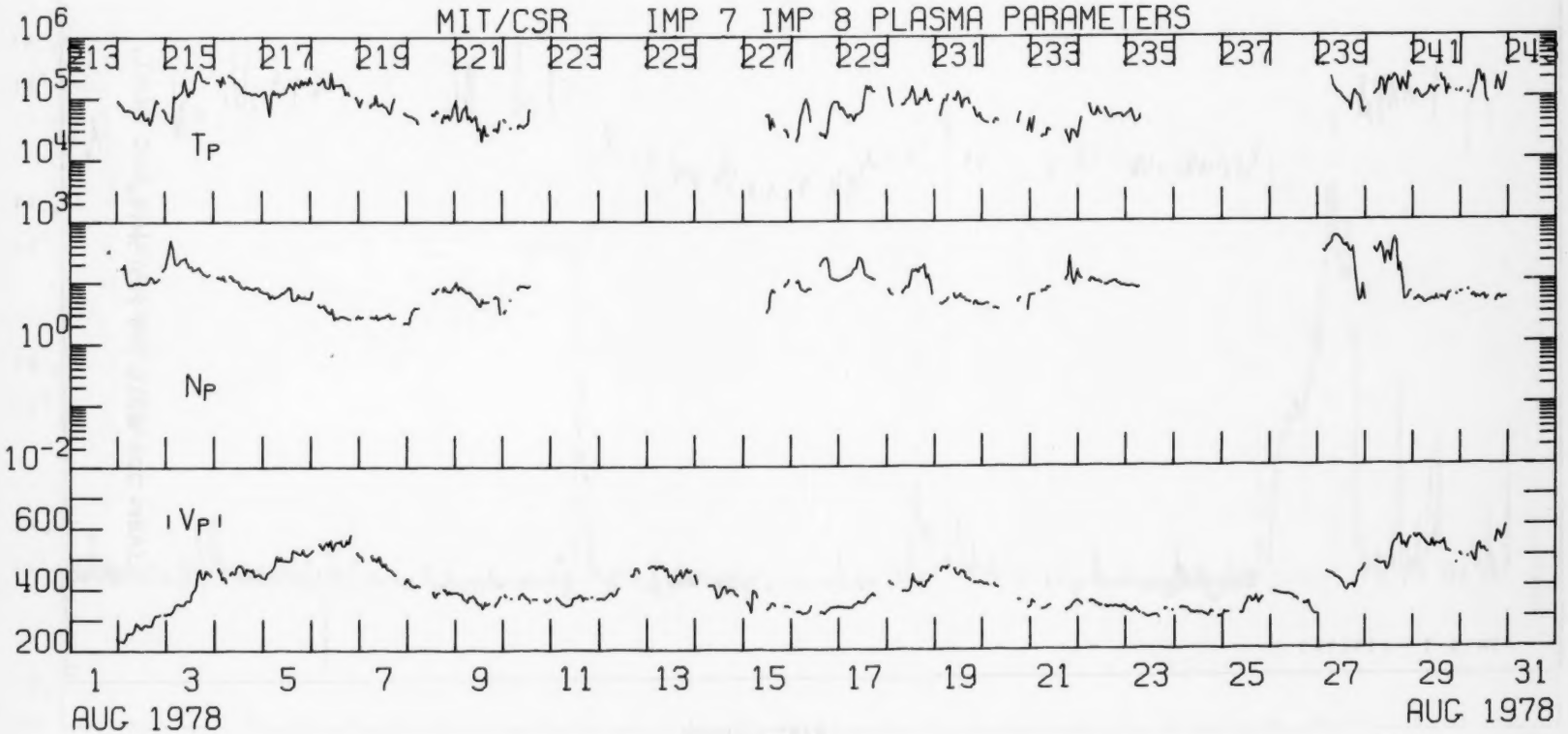
ARCE = Arcetri
BERL = Berlin-Adlershof
BORD = Bordeaux
BOUL = Boulder
CRIM = Simferopol
DWIN = Dwingeloo
GORK = Gorky
HARS = Harestua
HIRA = Hiraiso
HUAN = Huancayo
IRKU = Irkutsk
KIEV = Kiev
MANI = Manila
MCMA = McMath-Hulbert
NAGO = Nagoya
ONDR = Ondrejov
OTTA = Ottawa
PENT = Penticton
POTS = Potsdam
SAOP = Sao Paulo
SGMR = Sagamore Hill
SYDN = Sydney
TORN = Torun
TYKW = Toyokawa
TRST = Trieste
VORO = Voroshilov (Ussurisk)

Explanation of Type Code:

1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of Bursts
42 Series of Bursts
43 Onset of Noise Storm
44 Noise Storm in Progress
45 Complex
46 Complex F
47 Great Burst
48 Major
49 Major +

IMP 7 AND 8 SOLAR WIND PLASMA

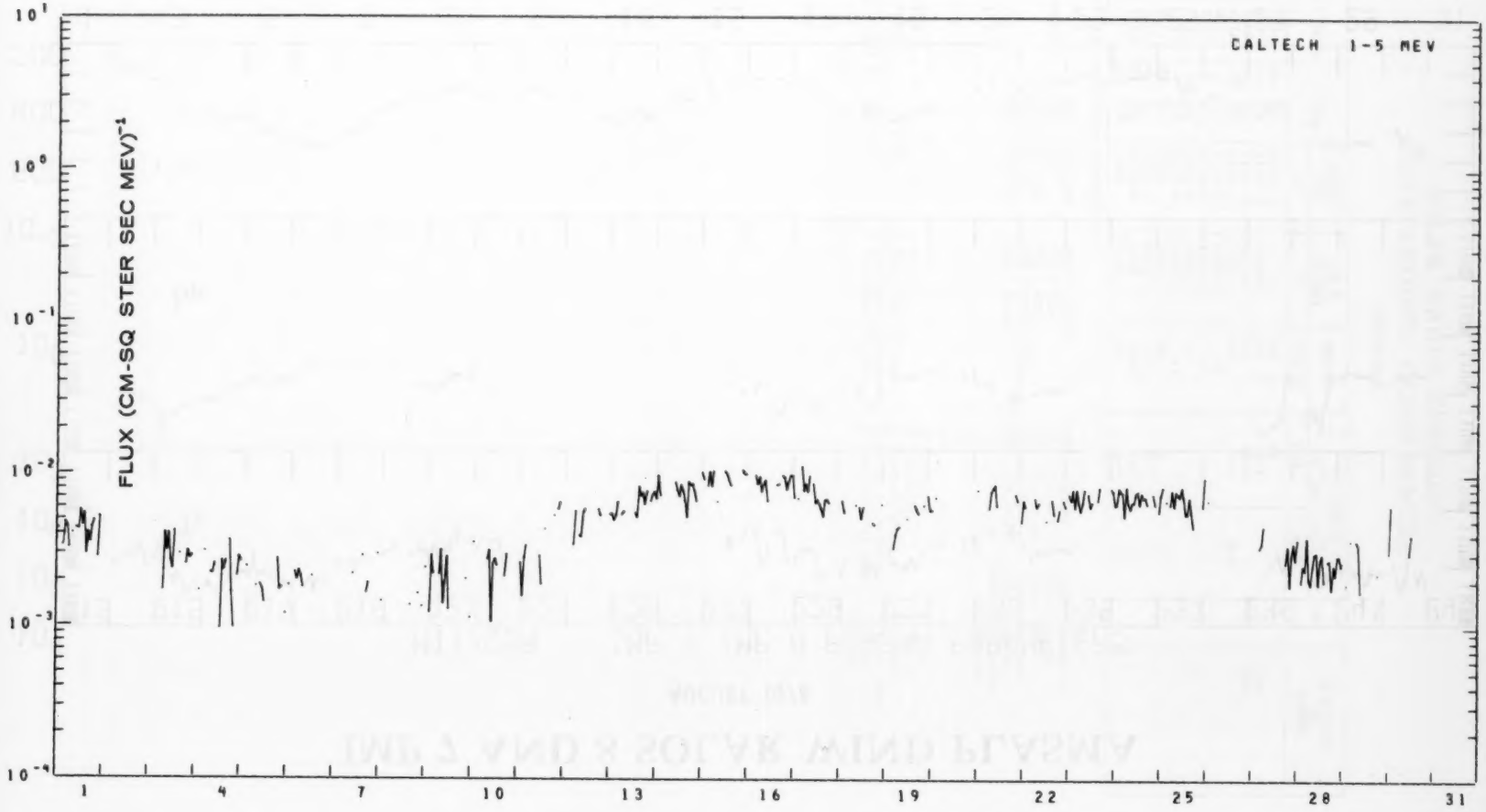
AUGUST 1978



31 Aug 78

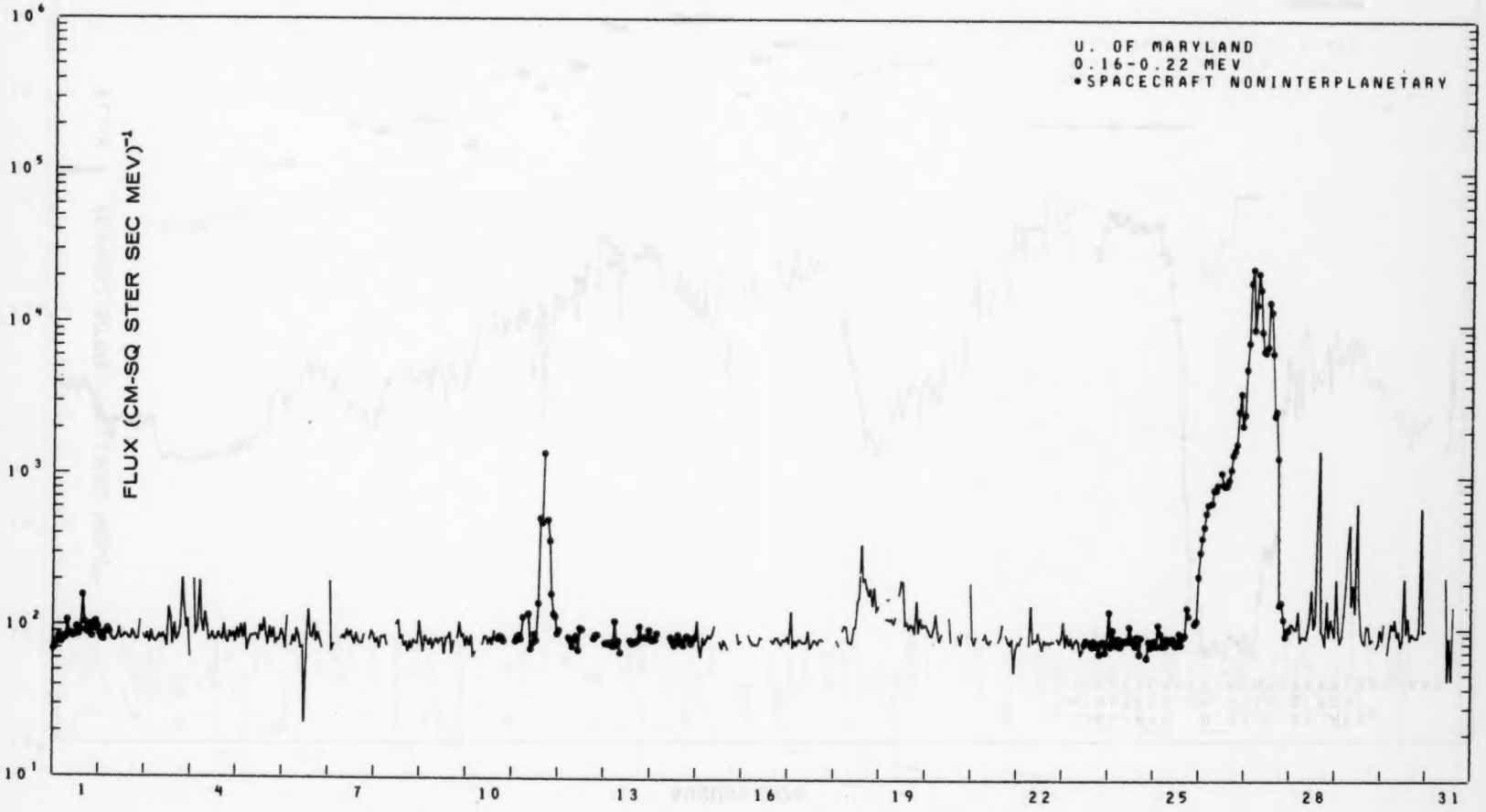
IMP 7 AND 8 ELECTRONS

AUGUST 1978



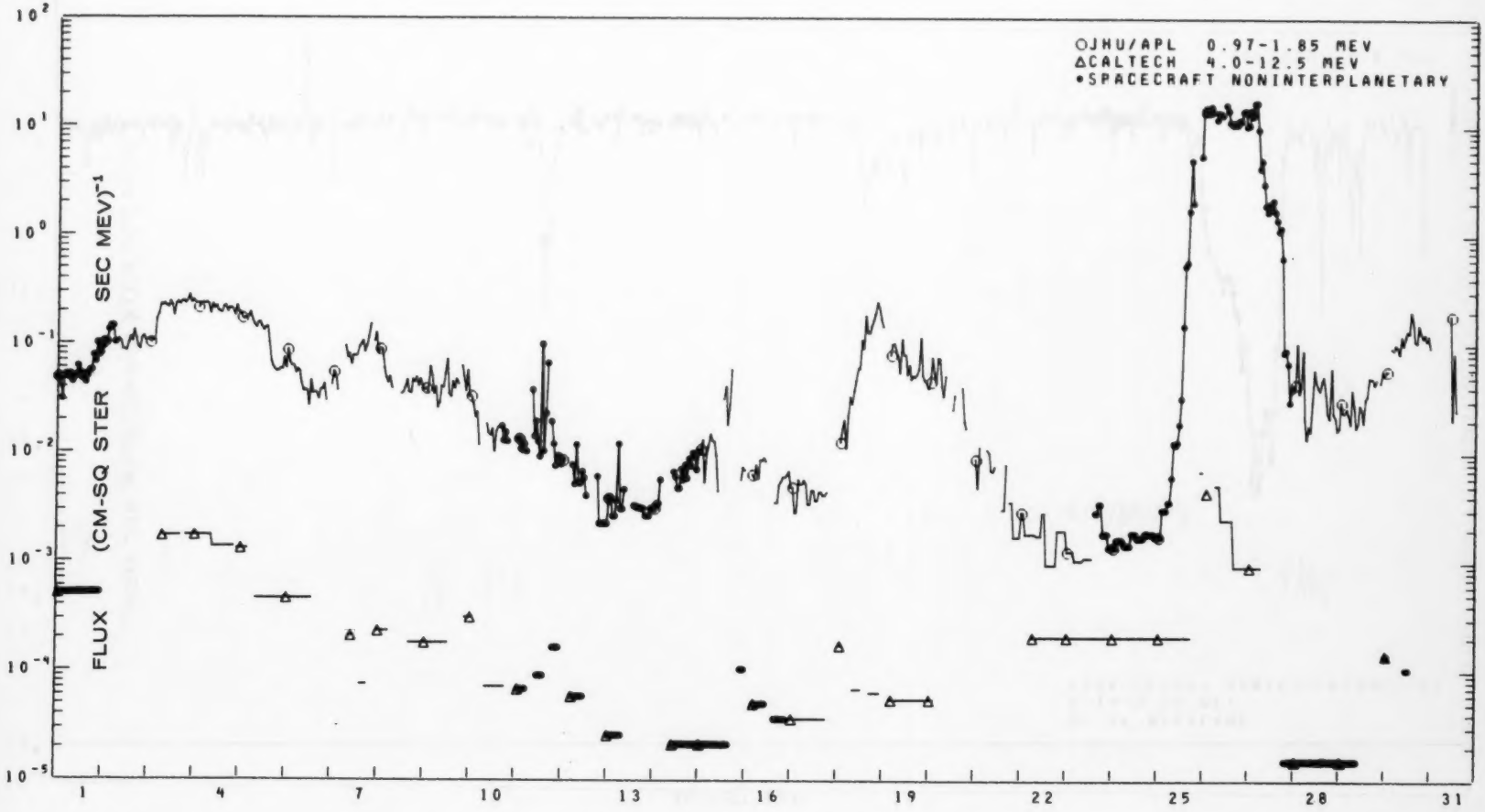
IMP 7 AND 8 LOW ENERGY PROTONS

AUGUST 1978



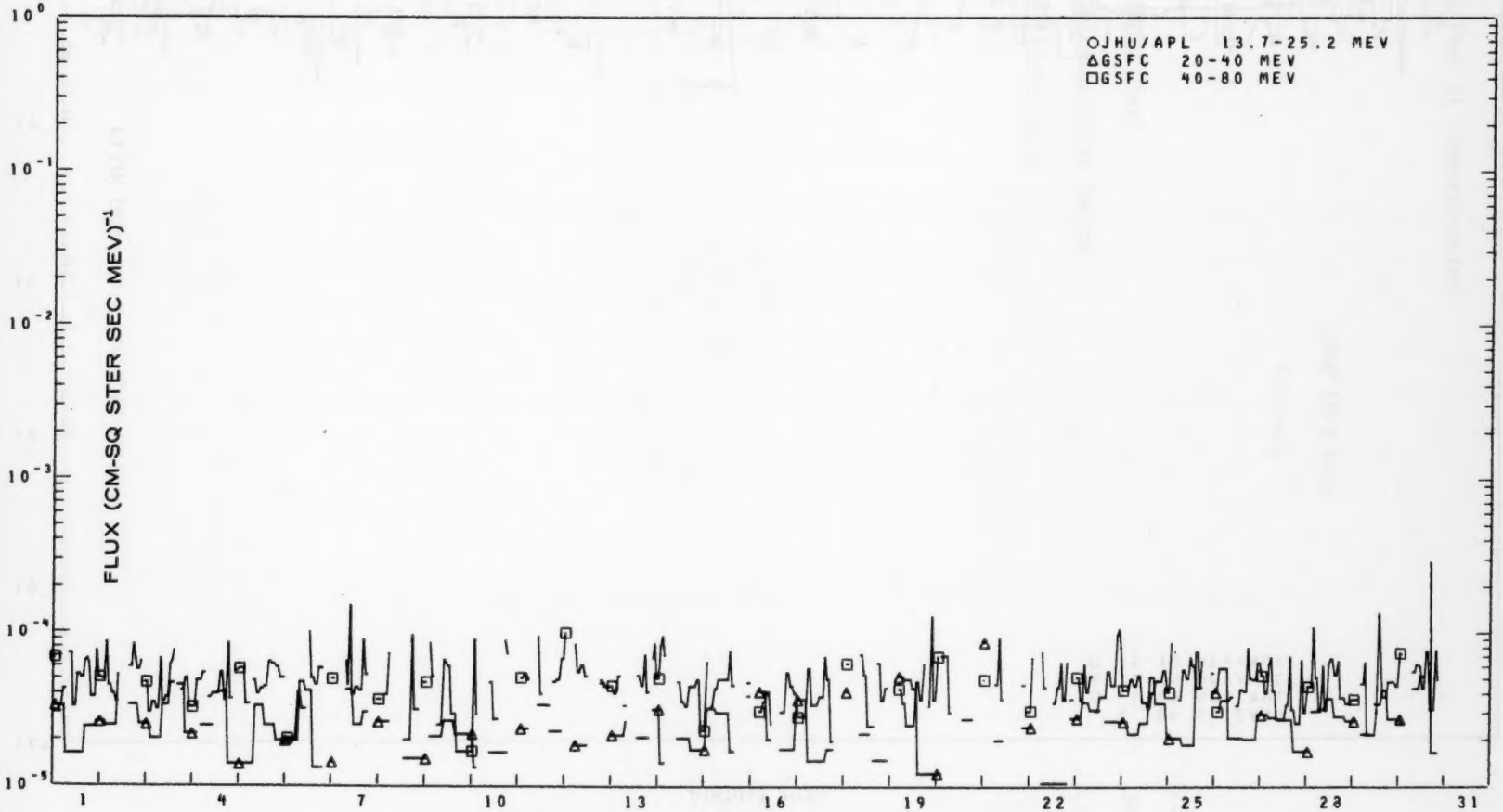
IMP 7 AND 8 INTERMEDIATE ENERGY PROTONS

AUGUST 1978



IMP 7 AND 8 HIGH ENERGY PROTONS

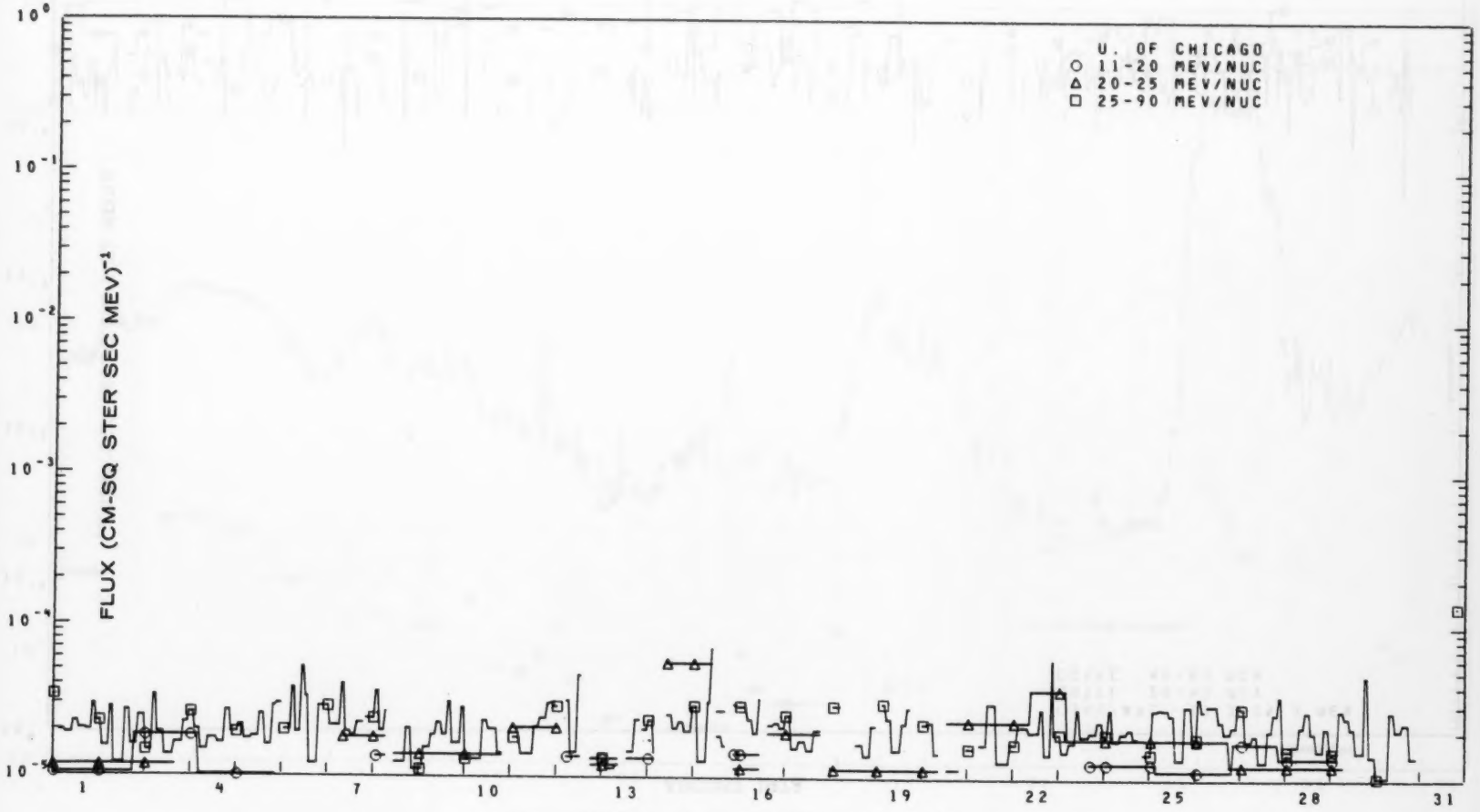
AUGUST 1978



35
Aug 78

IMP 7 AND 8 ALPHA PARTICLES

AUGUST 1978



JULY 1978 DATA

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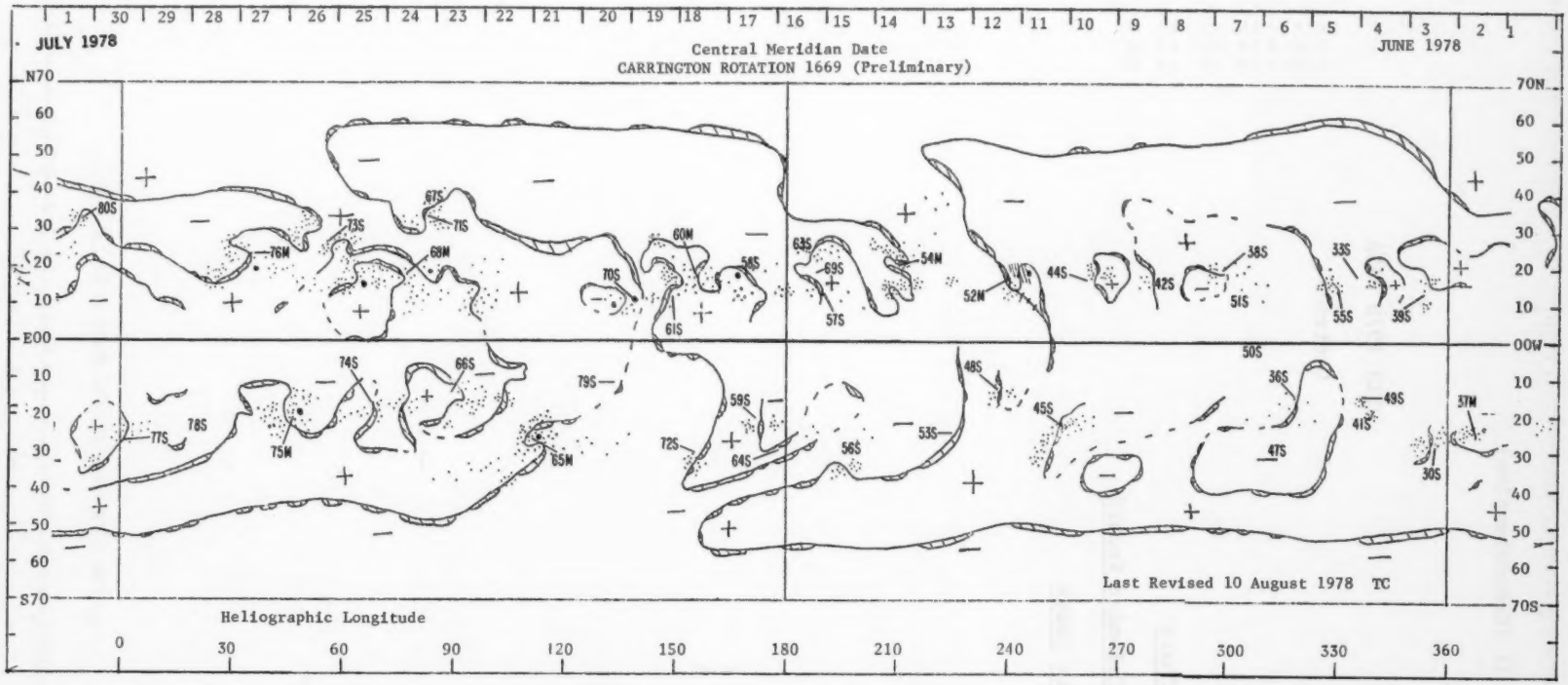
Abbreviated Calendar Record	40-47
Regional Flare Index	48

ABBREVIATED CALENDAR RECORD

Hα SYNOPTIC CHART

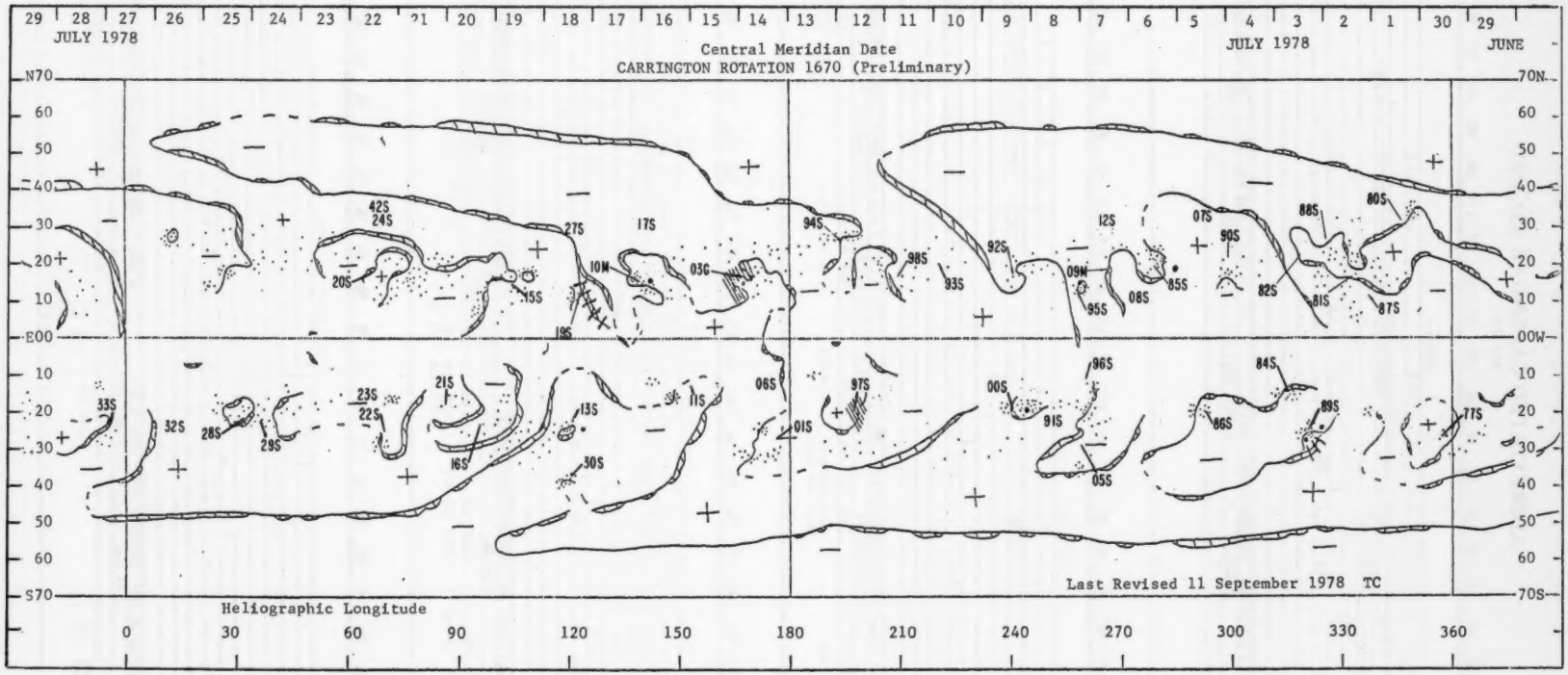
JUNE - JULY 1978



ABBREVIATED CALENDAR RECORD

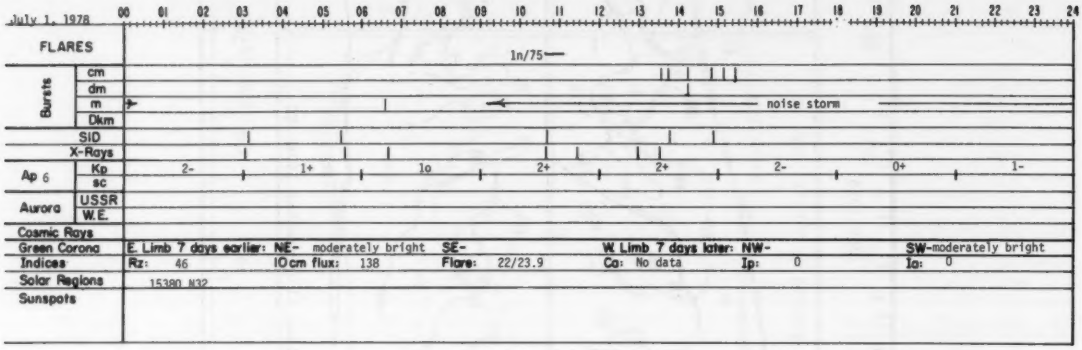
Hα SYNOPTIC CHART

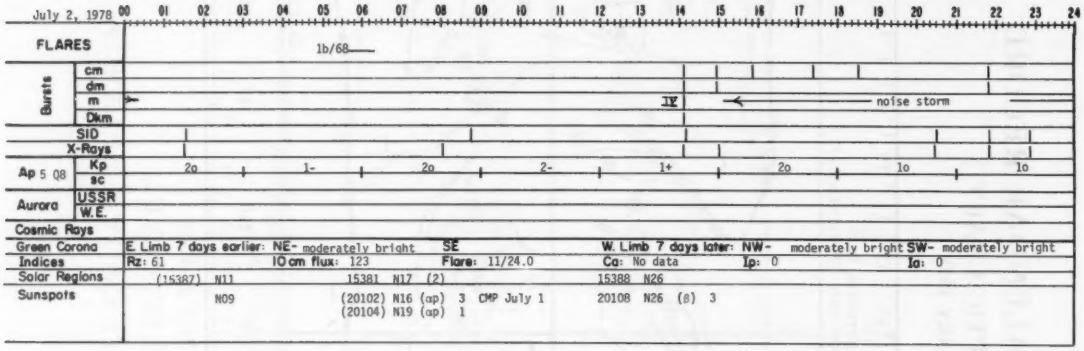
JUNE–JULY 1978

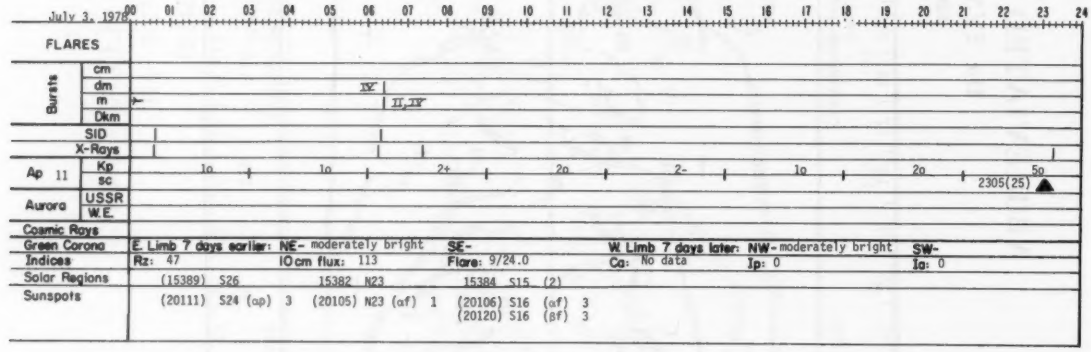


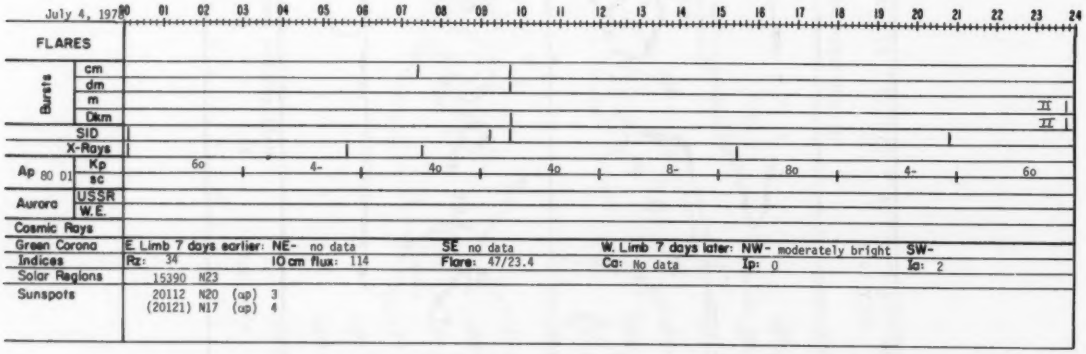
ABBREVIATED CALENDAR RECORD

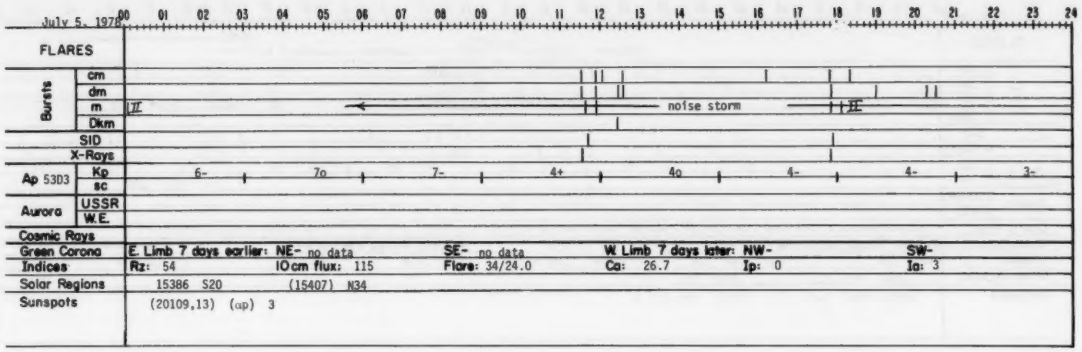
JULY 1978

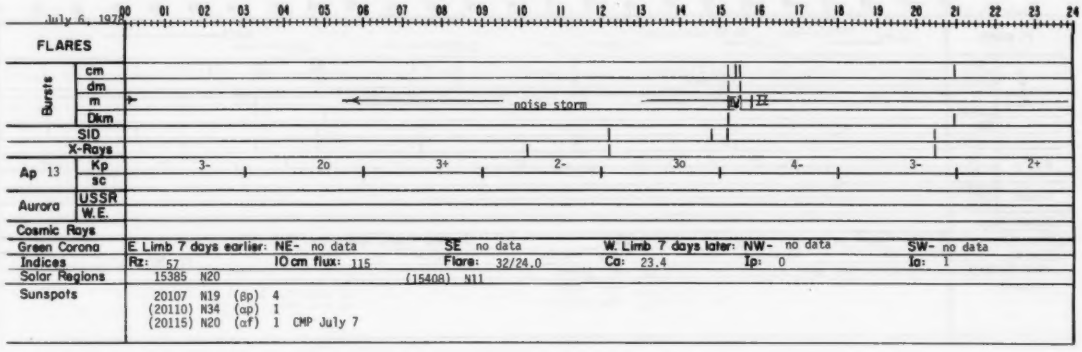


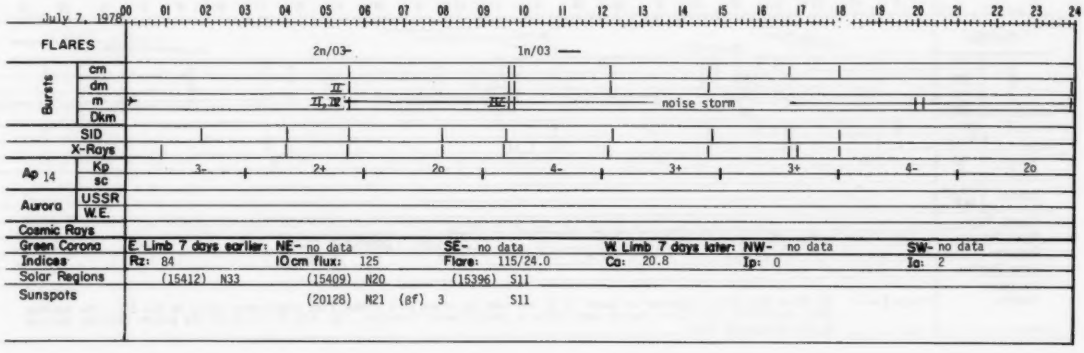


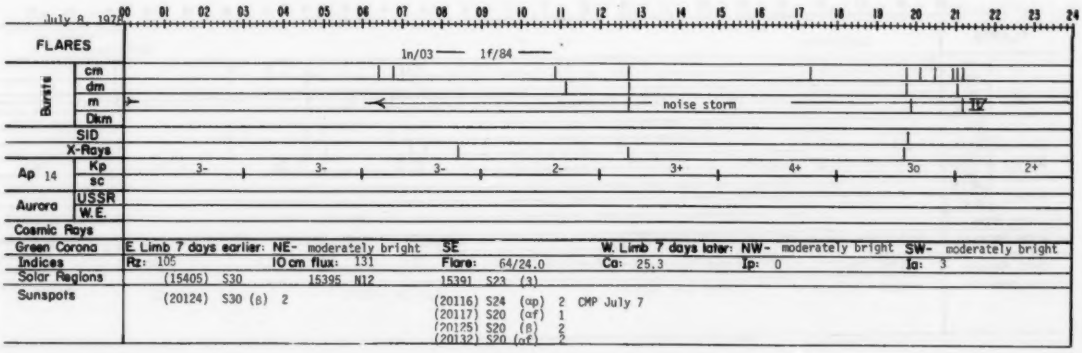





July 5, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 5303
Kp
sc
6- 7o 7- 4+ 4o 4- 4- 3-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW-
Indices
Rz: 54 10cm flux: 115 Flare: 34/24.0 Ca: 26.7 Ip: 0 Ia: 3
Solar Regions
15386 S20 (15407) N34
Sunspots
(20109,13) (αp) 3


July 6, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 13
Kp
sc
3- 2o 3+ 2- 3o 4- 3- 2+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 57 10cm flux: 115 Flare: 32/24.0 Ca: 23.4 Ip: 0 Ia: 1
Solar Regions
15385 N20 (15408) N11
Sunspots
20107 N19 (βp) 4
(20110) N34 (αp) 1
(20115) N20 (αf) 1 CMP July 7


July 7, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
2n/03
1n/03
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 14
Kp
sc
3- 2+ 2o 4- 3+ 3+ 4- 2o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 84 10cm flux: 125 Flare: 115/24.0 Ca: 20.8 Ip: 0 Ia: 2
Solar Regions
(15412) N33 (15409) N20 (15396) S11
Sunspots
(20128) N21 (βf) 3 S11


July 8, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/03
1f/84
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 14
Kp
sc
3- 3- 3- 2- 3+ 4+ 3o 2+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE W. Limb 7 days later: NW- moderately bright SW- moderately bright
Indices
Rz: 105 10cm flux: 131 Flare: 64/24.0 Ca: 25.3 Ip: 0 Ia: 3
Solar Regions
(15405) S30 15395 N12 15391 S23 (1)
Sunspots
(20124) S30 (β) 2
(20116) S24 (αp) 2 CMP July 7
(20117) S20 (αf) 1
(20125) S20 (β) 2
(20132) S20 (αf) 2

July 9, 1978

FLARES: 1f/03 — 1b/03 — 1b/03 — 1b/03 — 1n/97 — 2b/03

Bursts: cm, dm, m, Dkm — noise storm

SID

X-Rays

Ap 8 — Kp: 3o 1o 1o 1o 2o 3+ 2+ 2o — sc

Aurora: USSR, W.E.

Cosmic Rays: Forbush decrease that began on June 25 returned to normal.

Green Corona: E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW- moderately bright

Indices: Rz: 108 10 cm flux: 142 Flare: 119/24.0 Ca: 25.6 Ip: 2 Ia: 3

Solar Regions: 15392 N18 (2) 15400 S19

Sunspots: (20114) N16 (αf) 1 20122 S20 (β) 4

July 10, 1978

FLARES: 1b/03 — 1b/03 — 3b/03 — 2n/03 — 1f/03 — 1b/03 — 2b/03 — 1b/03

Bursts: cm, dm, m, Dkm — noise storm

SID

X-Rays

Ap 10 — Kp: 2o 2+ 3+ 2o 3- 2- 2+ 2+ — sc

Aurora: USSR, W.E.

Cosmic Rays

Green Corona: E. Limb 7 days earlier: NE- bright SE W. Limb 7 days later: NW- moderately bright SW-

Indices: Rz: 115 10 cm flux: 151 Flare: 440/23.6 Ca: 32.2 Ip: 0 Ia: 2

Solar Regions: 15393 N21 (4)

Sunspots

July 11, 1978

FLARES: 1n/10 — 1n/03 — 2b/03 — 2b/03 — 2b/03 — 1f/07 — 1n/03 — 1b/03 — 2b/03

Bursts: cm, dm, m, Dkm — noise storm

SID

X-Rays

Ap 6Q10 — Kp: 2o 2- 1+ 3- 1+ 1o 1- 1- — sc

Aurora: USSR, W.E.

Cosmic Rays

Green Corona: E. Limb 7 days earlier: NE- moderately bright SE- W. Limb 7 days later: NW- SW-

Indices: Rz: 127 10 cm flux: 158 Flare: 1206/23.8 Ca: 32.6 Ip: 2 Ia: 2

Solar Regions: 15398 N17 (4)

Sunspots

Remarks: Proton Event: The 20-40 MeV proton detector on board IMP 8 recorded the onset of a proton flux enhancement early in the day. The maximum level reached on July 13 was barely detectable by ground-based riometers. By July 23 the 20-40 MeV proton flux had decayed to its background level.

July 12, 1978

FLARES: 1b/03 — 1b/03

Bursts: cm, dm, m, Dkm — noise storm

SID

X-Rays

Ap 405 — Kp: 0+ 0+ 0+ 1- 1o 2+ 2o 2o — sc

Aurora: USSR, W.E.

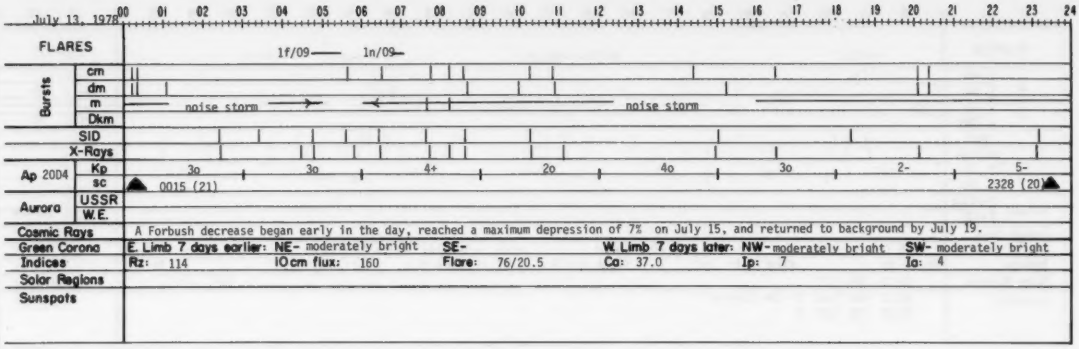
Cosmic Rays

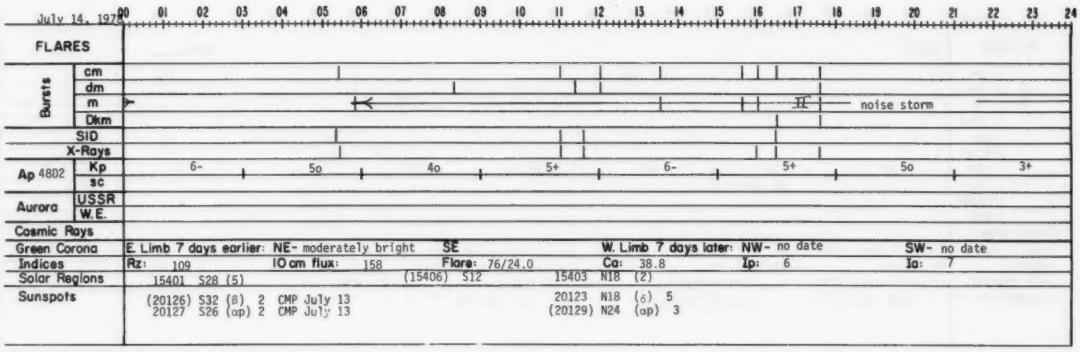
Green Corona: E. Limb 7 days earlier: NE- moderately bright SE W. Limb 7 days later: NW- SW- moderately bright

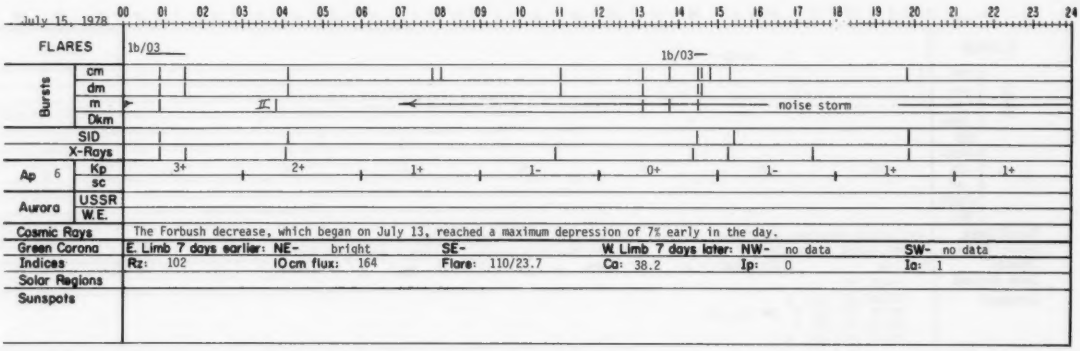
Indices: Rz: 111 10 cm flux: 169 Flare: 141/24.0 Ca: 39.3 Ip: 0 Ia: 0

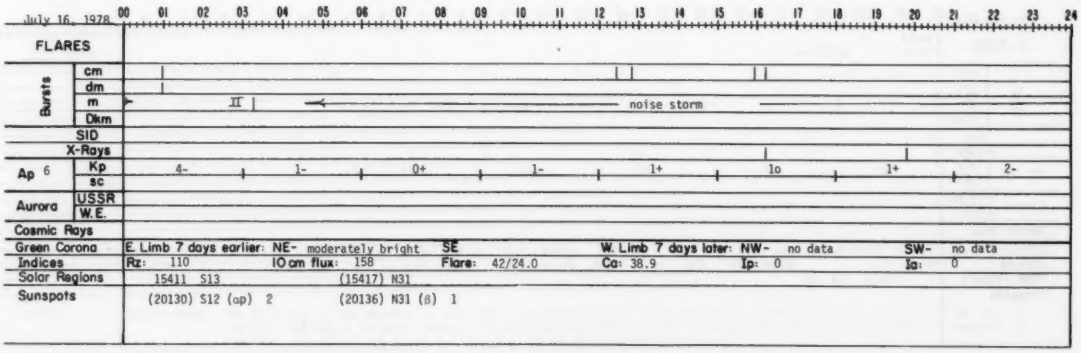
Solar Regions: 15397 S20 15394 N27 (2)

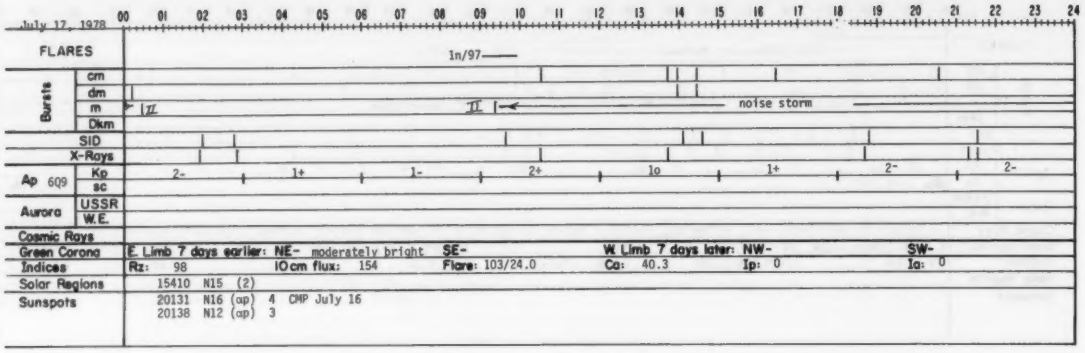
Sunspots: 20118 S18 (αp) 2 (20119) N26 (αp) 2

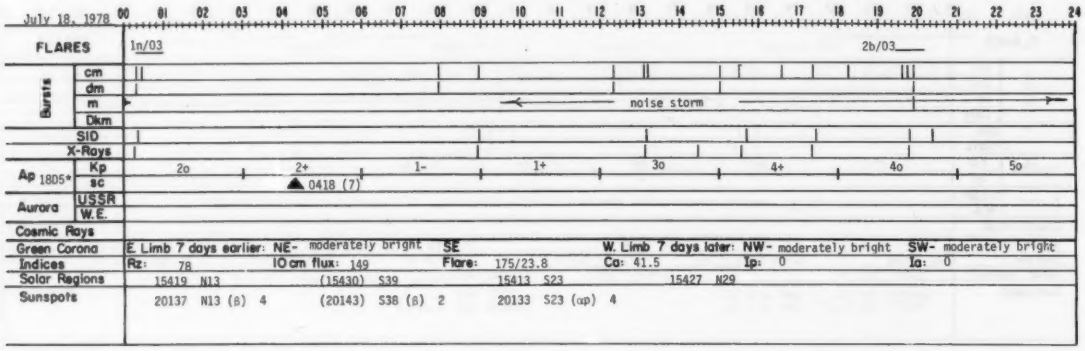

July 13, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1f/09 1n/09
Bursts
cm
dm
m
Dkm
noise storm
noise storm
SID
X-Rays
Ap 2004
Kp
sc
3o 3o 4+ 2o 4o 3o 2- 5-
0015 (21)
2328 (20)
Aurora
USSR
W.E.
Cosmic Rays
A Forbush decrease began early in the day, reached a maximum depression of 7% on July 15, and returned to background by July 19.
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE- W. Limb 7 days later: NW- moderately bright SW- moderately bright
Indices
Rz: 114 10cm flux: 160 Flare: 76/20.5 Ca: 37.0 Ip: 7 Ia: 4
Solar Regions
Sunspots

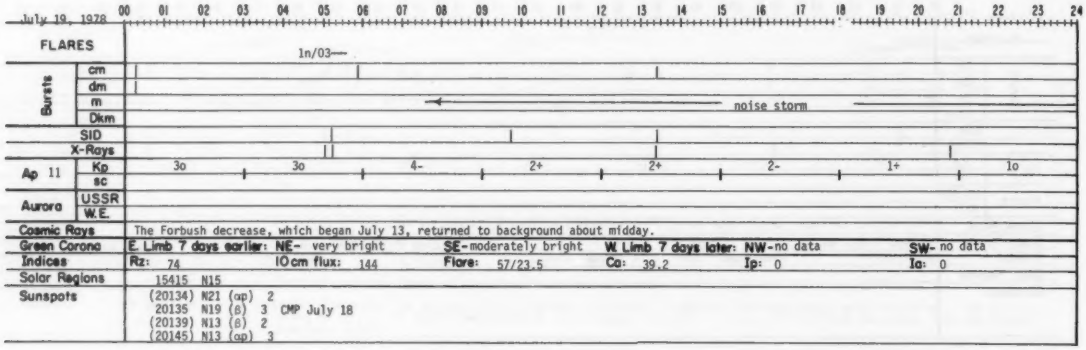

July 14, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 4802
Kp
sc
6- 5o 4o 5+ 6- 5+ 5o 3+
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE W. Limb 7 days later: NW- no date SW- no date
Indices
Rz: 109 10cm flux: 158 Flare: 76/24.0 Ca: 38.8 Ip: 6 Ia: 7
Solar Regions
15401 S28 (5) (15406) S12 15403 N18 (2)
Sunspots
(20126) S32 (8) 2 CMP July 13
20127 S26 (ap) 2 CMP July 13
20123 N18 (6) 5
(20129) N24 (ap) 3

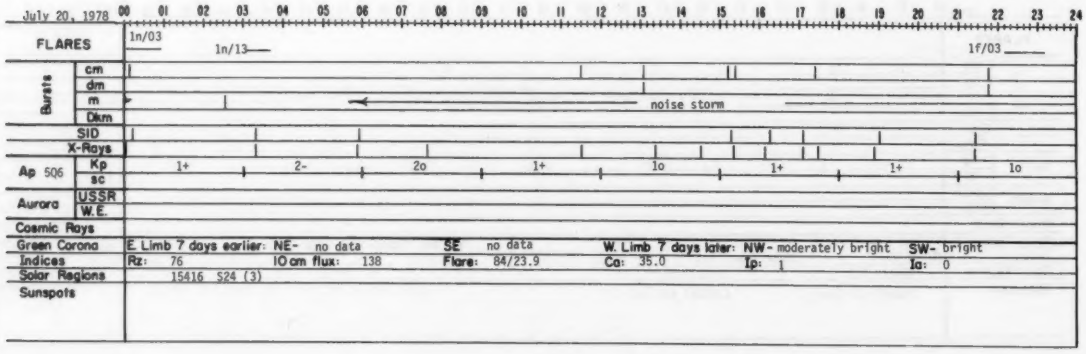

July 15, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1b/03
1b/03
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 6
Kp
sc
3+ 2+ 1+ 1- 0+ 1- 1+ 1+
Aurora
USSR
W.E.
Cosmic Rays
The Forbush decrease, which began on July 13, reached a maximum depression of 7% early in the day.
Green Corona
E. Limb 7 days earlier: NE- bright SE- W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 102 10cm flux: 164 Flare: 110/23.7 Ca: 38.2 Ip: 0 Ia: 1
Solar Regions
Sunspots

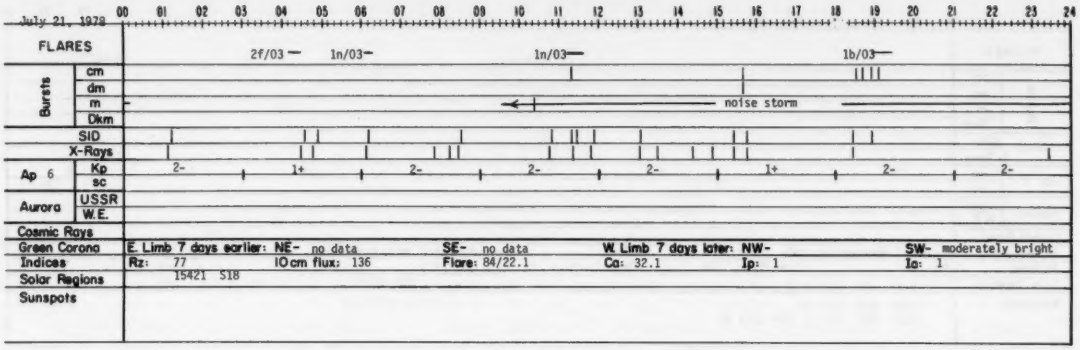

July 16, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 6
Kp
sc
4- 1- 0+ 1- 1+ 1o 1+ 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE W. Limb 7 days later: NW- no data SW- no data
Indices
Rz: 110 10cm flux: 158 Flare: 42/24.0 Ca: 38.9 Ip: 0 Ia: 0
Solar Regions
15411 S13 (15417) N31
Sunspots
(20130) S12 (ap) 2 (20136) N31 (8) 1

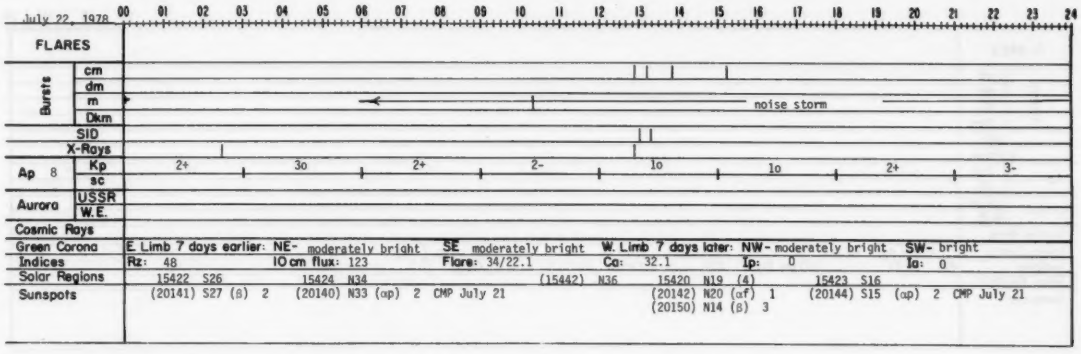

July 17, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/97
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 609
Kp
sc
2- 1+ 1- 2+ 1o 1+ 2- 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE-
W. Limb 7 days later: NW- SW-
Indices
Rz: 98 10cm flux: 154 Flare: 103/24.0 Ca: 40.3 Ip: 0 Ia: 0
Solar Regions
15410 N15 (2)
Sunspots
20131 N16 (ap) 4 CMP July 16
20138 N12 (ap) 3

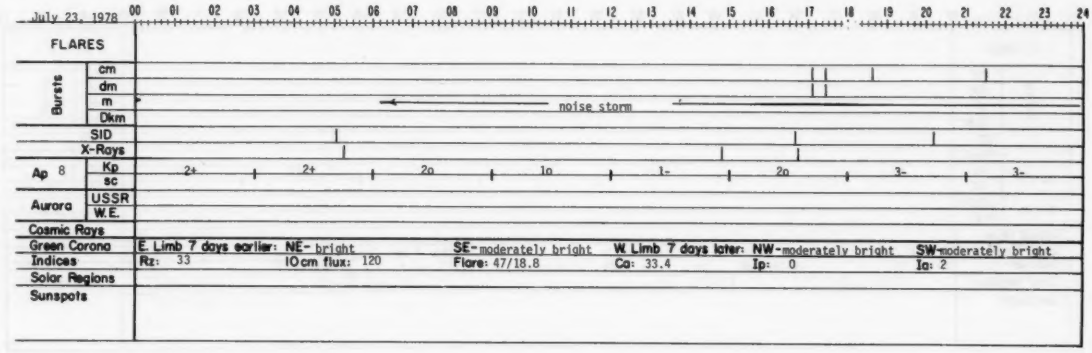

July 18, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/03
2b/03
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 1805*
Kp
sc
2o 2+ 1- 1+ 3o 4+ 4o 5o
0418 (7)
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE
W. Limb 7 days later: NW- moderately bright SW- moderately bright
Indices
Rz: 78 10cm flux: 149 Flare: 175/23.8 Ca: 41.5 Ip: 0 Ia: 0
Solar Regions
15419 N13 (15430) S39 15413 S23 15427 N29
Sunspots
20137 N13 (ß) 4 (20143) S38 (ß) 2 20133 S23 (ap) 4

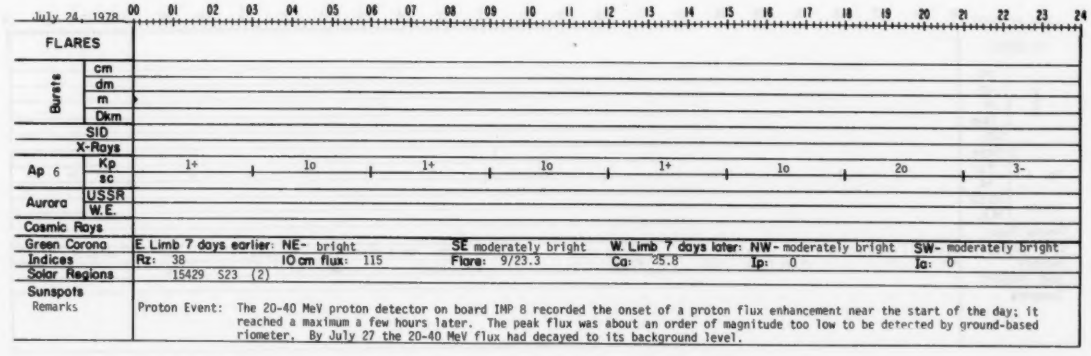

July 19, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/03
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 11
Kp
sc
3o 3o 4- 2+ 2+ 2- 1+ 1o
Aurora
USSR
W.E.
Cosmic Rays
The Forbush decrease, which began July 13, returned to background about midday.
Green Corona
E. Limb 7 days earlier: NE- very bright SE-moderately bright
W. Limb 7 days later: NW-no data SW- no data
Indices
Rz: 74 10cm flux: 144 Flare: 57/23.5 Ca: 39.2 Ip: 0 Ia: 0
Solar Regions
15415 N15
Sunspots
(20134) N21 (ap) 2
20135 N19 (ß) 3 CMP July 18
(20139) N13 (ß) 2
(20145) N13 (ap) 3


July 20, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
1n/03
1n/13
1f/03
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 506
Kp
sc
1+ 2- 2o 1+ 1o 1+ 1+ 1o
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE no data
W. Limb 7 days later: NW- moderately bright SW- bright
Indices
Rz: 76 10cm flux: 138 Flare: 84/23.9 Ca: 35.0 Ip: 1 Ia: 0
Solar Regions
15416 S24 (3)
Sunspots


July 21, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
2f/03
1n/03
1n/03
1b/03
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 6
Kp
sc
2- 1+ 2- 2- 2- 1+ 2- 2-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- no data SE- no data W. Limb 7 days later: NW- SW- moderately bright
Indices
Rz: 77 10cm flux: 136 Flare: 84/22.1 Ca: 32.1 Ip: 1 Ia: 1
Solar Regions
15421 S18
Sunspots


July 22, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 8
Kp
sc
2+ 3o 2+ 2- 1o 1o 2+ 3-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- moderately bright SE moderately bright W. Limb 7 days later: NW- moderately bright SW- bright
Indices
Rz: 48 10cm flux: 123 Flare: 34/22.1 Ca: 32.1 Ip: 0 Ia: 0
Solar Regions
15422 S26 15424 N34 (15442) N36 15420 N19 (4) 15423 S16
Sunspots
(20141) S27 (ß) 2 (20140) N33 (ap) 2 CMP July 21
(20142) N20 (af) 1 (20144) S15 (ap) 2 CMP July 21
(20150) N14 (ß) 3


July 23, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
noise storm
SID
X-Rays
Ap 8
Kp
sc
2+ 2+ 2o 1o 1- 2o 3- 3-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- bright SE- moderately bright W. Limb 7 days later: NW- moderately bright SW- moderately bright
Indices
Rz: 33 10cm flux: 120 Flare: 47/18.8 Ca: 33.4 Ip: 0 Ia: 2
Solar Regions
Sunspots


July 24, 1978
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
FLARES
Bursts
cm
dm
m
Dkm
SID
X-Rays
Ap 6
Kp
sc
1+ 1o 1+ 1o 1+ 1o 2o 3-
Aurora
USSR
W.E.
Cosmic Rays
Green Corona
E. Limb 7 days earlier: NE- bright SE moderately bright W. Limb 7 days later: NW- moderately bright SW- moderately bright
Indices
Rz: 38 10cm flux: 115 Flare: 9/23.3 Ca: 25.8 Ip: 0 Ia: 0
Solar Regions
15429 S23 (2)
Sunspots
Remarks
Proton Event: The 20-40 MeV proton detector on board IMP 8 recorded the onset of a proton flux enhancement near the start of the day; it reached a maximum a few hours later. The peak flux was about an order of magnitude too low to be detected by ground-based riometer. By July 27 the 20-40 MeV flux had decayed to its background level.

July 25, 1978

FLARES: 1f/16

Bursts: cm, dm, m, Dkm

SID

X-Rays

Ap 8 — Kp: 2+ | 2- | 1o | 1+ | 2- | 2- | 3o | 3o

sc

Aurora: USSR, W.E.

Cosmic Rays

Green Corona

Indices: E. Limb 7 days earlier: NE- bright; SE-; W. Limb 7 days later: NW- moderately bright; SW-
Rz: 30; 10cm flux: 110; Flare: 21/24.0; Ca: 24.3; Ip: 0; Ia: 1

Solar Regions: 15428 N23 (2 and 3)

Sunspots: 20146 N18 (β) 2
20147 N27 (β) 3 CMP July 26

July 26, 1978

FLARES

Bursts: cm, dm, m, Dkm

SID

X-Rays

Ap 507 — Kp: 2- | 2- | 1- | 1- | 2- | 1+ | 2o | 2o

sc

Aurora: USSR, W.E.

Cosmic Rays

Green Corona

Indices: E. Limb 7 days earlier: NE- moderately bright; SE; W. Limb 7 days later: NW- no data; SW- no data
Rz: 13; 10cm flux: 109; Flare: 14/23.6; Ca: 19.8; Ip: 0; Ia: 0

Solar Regions

Sunspots

July 27, 1978

FLARES

Bursts: cm, dm, m, Dkm

SID

X-Rays

Ap 404 — Kp: 1o | 0+ | 0+ | 2- | 2- | 1- | 1o | 2o

sc

Aurora: USSR, W.E.

Cosmic Rays

Green Corona

Indices: E. Limb 7 days earlier: NE- moderately bright; SE-; W. Limb 7 days later: NW- moderately bright; SW- moderately bright
Rz: 21; 10cm flux: 108; Flare: 14/23.0; Ca: 18.8; Ip: 0; Ia: 0

Solar Regions: (15432) S26 (3) (15433) S23

Sunspots

July 28, 1978

FLARES

Bursts: cm, dm, m, Dkm

SID

X-Rays

Ap 6 — Kp: 2- | 2+ | 3- | 2+ | 2- | 1- | 0+ | 0+

sc

Aurora: USSR, W.E.

Cosmic Rays

Green Corona

Indices: E. Limb 7 days earlier: NE- no data; SE no data; W. Limb 7 days later: NW- no data; SW- no data
Rz: 31; 10cm flux: 107; Flare: 7/23.7; Ca: 18.6; Ip: 0; Ia: 0

Solar Regions

Sunspots

July 29, 1978

		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
FLARES												1n/43 ——														
Bursts	cm																									
	dm																									
	m																									
	Dkm																									
SID																										
X-Rays																										
Ap 403	Kp	0o				0+			1o			1+			1o			1o			1o			2o		
	sc																									
Aurora	USSR																									
	W.E.																									
Cosmic Rays																										

Green Corona: E. Limb 7 days earlier: NE- no data; SE- no data; W. Limb 7 days later: NW-; SW- moderately bright

Indices: Rz: 48; 10cm flux: 106; Flare: 17/24.0; Ca: 15.6; Ip: 0; Ia: 0

Solar Regions: 15434 N15 (2 and 3); 15435 S16

Sunspots: (20149) S14 (af) 3

July 30, 1978

		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
FLARES																										
Bursts	cm																									
	dm																									
	m																									
	Dkm																									
SID																										
X-Rays																										
Ap 302	Kp	2-				1-			0+			1o			1o			1o			0+			0+		
	sc																									
Aurora	USSR																									
	W.E.																									
Cosmic Rays																										

Green Corona: E. Limb 7 days earlier: NE- no data; SE no data; W. Limb 7 days later: NW-; SW- moderately bright

Indices: Rz: 35; 10cm flux: 106; Flare: 16/24.0; Ca: 14.0; Ip: 0; Ia: 0

Solar Regions: 15436 S27 (2); 15439 S17 (3)

Sunspots:

July 31, 1978

		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
FLARES																										
Bursts	cm																									
	dm																									
	m																									
	Dkm																									
SID																										
X-Rays																										
Ap 201	Kp	0o				0o			0+			0+			0+			1-			1-			0+		
	sc																									
Aurora	USSR																									
	W.E.																									
Cosmic Rays																										

Green Corona: E. Limb 7 days earlier: NE-; SE-; W. Limb 7 days later: NW-; SW- moderately bright

Indices: Rz: 36; 10cm flux: 106; Flare: 19/23.2; Ca: 14.3; Ip: 0; Ia: 0

Solar Regions: 15448 N27; (15440) N24 (2)

Sunspots: (20150) N24 (ap) 7

REGIONAL FLARE INDEX

INCLUDES ALL FLARES

JULY 1978

MC MATH PLAGE NO.	LAT	CMP DATE	DATE FIRST FLARE	DATE LAST FLARE	FLARE-INDEX SUM	FLARE-INDEX MEAN	TOTAL NO. OF FLARES
15387	N11	78/07/02.1	78/07/06	78/07/06	.84	.84	1
15381	N16	78/07/02.3	78/06/26	78/07/03	91.54	11.44	32
15388	N28	78/07/02.9	78/07/04	78/07/07	45.14	11.28	14
15389	S26	78/07/03.2	78/07/04	78/07/09	63.27	10.55	34
15382	N23	78/07/03.4	78/06/27	78/06/29	2.78	.93	3
15384	S15	78/07/03.7	78/06/28	78/07/09	28.49	2.37	24
15390	N22	78/07/04.5	78/07/07	78/07/07	3.38	3.38	1
15386	S20	78/07/05.4	78/07/05	78/07/05	5.28	5.28	1
15407	N34	78/07/05.5	78/07/11	78/07/12	7.23	3.62	2
15385	N20	78/07/06.3	78/06/29	78/07/04	12.84	2.14	13
15409	N20	78/07/07.5	78/07/10	78/07/13	55.58	13.89	33
15395	N12	78/07/08.1	78/07/07	78/07/07	5.28	5.28	1
15391	S22	78/07/08.4	78/07/08	78/07/12	4.22	.84	2
15400	S20	78/07/09.3	78/07/06	78/07/15	88.22	8.82	28
15397	S20	78/07/12.6	78/07/06	78/07/17	66.60	5.55	17
15394	N27	78/07/12.9	78/07/15	78/07/15	1.92	1.92	1
15401	S29	78/07/14.3	78/07/11	78/07/20	15.62	1.56	6
15403	N18	78/07/14.9	78/07/07	78/07/21	2357.72	157.18	172
15410	N15	78/07/17.3	78/07/10	78/07/21	86.55	7.21	36
15413	S24	78/07/18.3	78/07/14	78/07/23	59.58	5.96	16
15430	S39	78/07/18.3	78/07/21	78/07/21	1.98	1.98	1
15415	N16	78/07/19.6	78/07/13	78/07/23	106.37	9.67	31
15416	S25	78/07/20.0	78/07/25	78/07/25	12.03	12.03	6
15421	S18	78/07/20.9	78/07/26	78/07/26	.85	.85	1
15422	S27	78/07/22.1	78/07/17	78/07/17	2.59	2.59	1
15442	N36	78/07/22.4	78/07/28	78/07/28	.85	.85	1
15423	S17	78/07/22.7	78/07/20	78/07/23	40.01	10.00	8
15420	N19	78/07/22.7	78/07/17	78/07/17	.84	.84	1
15429	S23	78/07/24.8	78/07/22	78/07/27	11.29	1.88	5
15428	N23	78/07/25.2	78/07/22	78/07/31	53.35	5.33	17
15434	N15	78/07/29.2	78/07/27	78/07/27	3.45	3.45	1
15436	S27	78/07/30.7	78/07/24	78/07/24	.85	.85	1
15440	N23	78/07/31.4	78/07/24	78/07/27	3.66	.92	3
15448	N26	78/07/31.6	78/08/06	78/08/06	.87	.87	1

Miscellaneous Data

Contents

	Page
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SOLAR WIND

Interplanetary Scintillations

OCTOBER 1978

DAY	3C48 VEL	3C48 ERR	3C144 VEL	3C144 ERR	3C147 VEL	3C147 ERR	3C161 VEL	3C161 ERR	3C237 VEL	3C237 ERR	3C273 VEL	3C273 ERR	3C298 VEL	3C298 ERR	3C459 VEL	3C459 ERR
1									480	66			373	5		
2			502	16			458	16	619	81			323	56		
3			351	60			439	40	463	8			382	13		
4			473	18			500	37	436	14			411	31		
5			604	188					568	16			363	35		
6			443	10			266	8	315	18			443	32		
7			447	95			325	108	274	14			379	6		
8							217	4	313	5			344	4		
9			337	52			266	5	272	15			440	10		
10			382	18			406	43	298	17			391	9		
11			315	8			291	22	405	6			373	4		
12			384	15	355	56	346	5	578	99			452	46		
13			503	9			384	26								
14			354	12			434	15	561	17			591	8		
15			520	14			337	6	365	23			447	59		
16			404	10			380	11	330	37			491	95		
17			336	35			389	37	336	6	288	60	411	70		
18			375	7			487	4					563	15		
19			369	29			285	6					610	126		
20			342	39			332	35	370	28	285	13	697	8		
21			356	17			603	71	475	20	466	74				
22			394	32					362	29	280	57	453	30		
23			444	50					317	20						
24									266	5	243	3	328	103	415	9
25			354	7			297	31	284	10	258	4	369	25	396	32
26			261	68					309	10	326	20	446	17	434	31
27			363	17	292	18	354	4	402	20	401	18	511	107	358	12
28			375	5			323	6	318	5	374	22	637	13	333	24
29			442	57			301	4	405	39	292	4	530	76		
30							310	5			274	7				
31			355	20			357	3	343	11	313	4				

OCTOBER 5	UT	LAT	DIST	DLON
3C48	9.	11.	1.27	5.
3C144	13.	5.	1.13	15.
3C147	12.	12.	1.11	14.
3C161	14.	-2.	1.07	14.
3C237	18.	-2.	0.67	48.
3C273	20.	32.	0.14	84.
3C298	22.	49.	0.43	-57.
3C459	6.	8.	1.28	-5.

15	UT	LAT	DIST	DLON
	8.	10.	1.28	3.
	12.	4.	1.17	13.
	11.	11.	1.15	13.
	14.	-2.	1.11	13.
	17.	-1.	0.78	38.
	19.	13.	0.30	74.
	21.	68.	0.35	-45.
	6.	8.	1.26	-7.

25	UT	LAT	DIST	DLON
	8.	9.	1.28	1.
	12.	3.	1.21	11.
	11.	10.	1.19	11.
	13.	-3.	1.15	11.
	17.	0.	0.88	28.
	19.	6.	0.45	63.
	21.	71.	0.33	39.
	5.	7.	1.24	-9.

SOLAR WIND

Interplanetary Scintillations

NOVEMBER 1978

DAY	3C48 VEL	ERR	3C144 VEL	ERR	3C147 VEL	ERR	3C161 VEL	ERR	3C237 VEL	ERR	3C273 VEL	ERR	3C298 VEL	ERR	3C459 VEL	ERR
1			395	12					291	23	311	15	446	30	309	36
2							255	6	313	25	300	5			327	25
3							289	30	370	5	348	22	465	7	311	15
4									353	5	323	4	452	18		
5							362	47	413	80	364	8				
6			247	19					393	69	338	5	242	23	347	4
7									389	15	383	13			339	31
8							439	29			338	10	443	85	432	38
9							462	53	351	7	421	10	461	42	466	66
10									266	5	339	16	556	82	369	8
11											451	23	497	40	506	18
13											423	9	344	5		
14											360	5	297	4		
15							387	9			368	5	331	5	390	49
16							394	40	369	8	360	6	304	4		
17							298	9	437	10	306	3	298	4		
19							380	21	387	43	323	5	321	3	351	10
20							380	3	364	4	407	4	383	12	474	3
21							439	28	471	89	506	5	376	5	388	59
22							421	17	438	12	550	8	483	5	521	38
23							505	58	334	25	494	9	434	4		
24									341	92	520	13	354	4	501	15
25									500	9	519	12	430	5	392	117
26							433	36	558	29	616	24	366	8	481	29
27							360	43	654	135	600	6	414	4	378	64
28											610	53	394	8		
29											544	50	404	5		
30									346	17	386	19	344	4	361	13

NOVEMBER 5	UT	LAT	DIST	DLON
3C48	7.	8.	1.28	-1.
3C144	11.	2.	1.24	9.
3C147	10.	9.	1.22	9.
3C161	12.	-4.	1.18	10.
3C237	16.	0.	0.95	17.
3C273	18.	3.	0.61	52.
3C298	20.	46.	0.40	59.
3C459	4.	6.	1.21	-11.

15	UT	LAT	DIST	DLON
3C48	6.	8.	1.27	-3.
3C144	10.	1.	1.27	7.
3C147	9.	7.	1.24	8.
3C161	12.	-5.	1.21	8.
3C237	15.	0.	1.01	17.
3C273	17.	1.	0.74	42.
3C298	19.	30.	0.50	56.
3C459	4.	6.	1.17	-13.

25	UT	LAT	DIST	DLON
3C48	6.	7.	1.26	-6.
3C144	10.	0.	1.29	5.
3C147	9.	6.	1.26	6.
3C161	11.	-6.	1.24	6.
3C237	15.	-1.	1.06	16.
3C273	17.	0.	0.85	32.
3C298	18.	20.	0.62	49.
3C459	3.	5.	1.13	-14.

SOLAR WIND
Interplanetary Scintillations

DECEMBER 1978

DAY	3C48 VEL	3C48 ERR	3C144 VEL	3C144 ERR	3C147 VEL	3C147 ERR	3C161 VEL	3C161 ERR	3C237 VEL	3C237 ERR	3C273 VEL	3C273 ERR	3C298 VEL	3C298 ERR	3C459 VEL	3C459 ERR
1	464	39							233	27	331	4	368	7	388	3
2	431	15							327	6	295	5	348	5	358	5
3	441	39							341	15	285	6	336	4	337	21
4	380	22							275	20	350	3	326	4	344	3
5	288	3									403	9	363	4	381	21
6											473	6	364	5	393	33
7	328	24									426	10	372	13		
8											379	8	384	9		
9											382	30				
10													403	8	215	37
11											327	42	372	4	267	38
12													388	22	311	8
13	353	4							256	29	313	4	492	5	353	9
14	313	7							519	5	469	5	515	11	445	11
15	373	4							598	45	377	5	566	6	376	8
16									470	20	479	6	397	6	465	5
17	347	4							460	15	366	8	382	4		
18	374	11							444	8	415	6	502	8	500	4
19	409	29							509	20	443	15	376	7	530	7
20	283	14									409	43	465	7	424	11
21	376	57									385	39	510	11		
22	554	67							461	16	328	61	468	17	501	6
23	400	5									722	77	489	22		
24	327	34									527	84	425	7	464	11
25	370	14									455	7	418	5	484	8
26	423	10							520	20	397	6	383	3	428	57
27	352	32							263	11	401	6	461	22	468	23
28	429	12									331	3	446	19	446	71
29	435	3									401	9	397	4		
30	426	15														
31									413	128	532	44	356	20	346	28

DECEMBER 5	UT	LAT	DIST	DLON
3C48	5.	6.	1.23	-8.
3C144	9.	0.	1.30	2.
3C147	8.	5.	1.27	3.
3C161	10.	-7.	1.25	4.
3C237	14.	-2.	1.11	15.
3C273	16.	0.	0.93	22.
3C298	18.	13.	0.73	41.
3C459	2.	4.	1.08	-15.

15	UT	LAT	DIST	DLON
	4.	5.	1.21	-9.
	8.	-1.	1.30	-0.
	7.	4.	1.28	1.
	10.	-7.	1.26	2.
	13.	-3.	1.15	14.
	15.	-1.	0.98	17.
	17.	7.	0.83	33.
	2.	3.	1.03	-16.

25	UT	LAT	DIST	DLON
	4.	4.	1.17	-11.
	7.	-2.	1.30	-2.
	7.	3.	1.27	-1.
	9.	-8.	1.27	-0.
	12.	-4.	1.19	12.
	14.	-2.	1.03	17.
	16.	3.	0.91	24.
	1.	2.	0.98	-17.

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

OCTOBER 1978

OCT 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
01	1316	2245	HARV										
02	1316	2310	HARV										
03	1316	2300	HARV				1803	1813	3	1803	1813	3	IIIN
			HARV				1907	1908	2	1907	1908	2	IIIG
			HARV				2143		2	2143		2	IIIG
04	1316	2245	HARV				1504	1505	3	1504	1505	3	IIIG,V
			HARV	1528		2	1526	1530	3	1526	1530	3	IIIGG,V
			HARV				1532	1537	2	1534	1536	1	IIIGG
			HARV				1539	1543	1				I
			HARV				1732	1735	2	1732	1735	2	IIIGG
			HARV				2008		1	2008		1	IIIG
			HARV				2038		2	2038		2	IIIG
			HARV				2105	2109	2				IIIGG
			HARV				2142	2146	2				IIIG
05	1316	2245	HARV				1328	1852	1				IN,W
			HARV	1403	1408	2						IV	
			HARV				1403	1412	2				UNCL
			HARV				1744	1745	2	1744	1745	2	IIIG
			HARV	1943	1944	1	1943	1945	3	1943	1945	3	IIIGG,V
			HARV				1949	1959	2	1949	1959	2	IIIGG
06	1316	2245	HARV				1502		2				IIIB
			HARV				1531		2				IIIG
			HARV	1533		1							IIIG
			HARV	1544		3							IIIG
			HARV				1644	1645	2	1644	1645	2	IIIG
			HARV	1654	1657	2	1653	1655	3	1653	1655	3	IIIGG,V
			HARV				1700	1705	2				I
			HARV				1703		3	1703		3	IIIG,V
			HARV				1706	1710	2	1706	1710	2	II
			HARV				1715	1721	1	1718	1719	1	II
			HARV	2119	2120	3							IIIG
07	1316	2245	HARV				1733		1				U,W
			HARV				2055	2245	1				IN,W
08	1316	2250	HARV				1828		1				IIIG,W
			HARV	1835	1837	1							
09	1316	2245	HARV	1738	1739	3							IIIG
			HARV				1758		1	1758		2	IIIB
			HARV				1824		1	1824		1	IIIB
			HARV	1924		1	1924		1				IIIG,W
			HARV	1939	1940	1	1939	1940	1				IIIG
			HARV	1950	1953	2	1950	1953	2				IIIGG,V
			HARV				1959	2016	3	2011	2016	2	II
			HARV				2017	2115	2				IC
			HARV				2024		1	2024		1	IIIG
10	1331	2245	HARV				1912		2				IIIG
11	1331	2245	HARV				1938		3	1938		3	IIIB
12	1331	2245	HARV										
13	1331	2245	HARV				1331	1510	1				I
			HARV	1331	1420	3							IIIN
			HARV				1505	2105	2	1505	2105	2	I
			HARV	1536	1543	3							IIIG
			HARV				1742	1744	3	1742	1744	3	IIIG
			HARV				1749	1750	3	1749	1750	2	IIIG
			HARV				1817	1820	3	1817	1820	3	IIIGG
			HARV				1935	1940	3				UNCL
			HARV				1953	2006	3	2053	2106	3	IIIGG
			HARV				2105	2200	1				IN
14	1330	2245	HARV				1447		2	1447		1	IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

OCTOBER 1978

OCT 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
14			HARV				1513		2	1513		1	IIIB
			HARV				1612		2	1612		2	IIIG
			HARV				1729	1730	2	1729	1730	2	IIIG
			HARV				1740		1	1740		1	IIIB
			HARV				1900		1	1900		2	IIIB
15	1331	2245	HARV				1652	1653	1	1652	1653	1	IIIG
			HARV				1757		2	1757		2	IIIB
16	1330	2300	HARV				1632		2				IIIG
			HARV				1651		1				IIIG
17	1330	2245	HARV										
18	1330	2245	HARV				1539		2				IIIB
			HARV				2012	2014	2	2012	2014		IIIGG
19	1330	2245	HARV										
20	1330	2245	HARV										
21	1330	2245	HARV	1559	1602	1	1557	1602	2	1601	1602	2	IIIGG,V
			HARV				1609	1617	3				II
			HARV				1617	1630	1				IC
			HARV				1630	1725	2				IC
			HARV				1725	1738	1				I
			HARV				1911		2	1911		2	IIIG
			HARV				1934		1	1934		1	IIIB
			HARV				1955		1				
22	1330	2245	HARV				1801	1808	3	1801	1808	3	IIIGG
			HARV				1826		2	1826		2	IIIB
23	1330	2245	HARV	1657	1701	1							IIIG,W
			HARV				1702		2	1702		2	IIIG
			HARV				1806	1807	1	1806	1807	1	IIIG
24	1330	2245	HARV				1523		2				IIIB
			HARV				1842	1843	3	1842	1843	3	IIIG
25	1330	2245	HARV	1518		3	1518		3				IIIG
			HARV				1559		1				IIIG
			HARV	1855		1	1855		2				IIIG
			HARV				1914		2	1914		2	IIIG
26	1330	2245	HARV										
27	1330	2245	HARV				1826		1	1826		1	IIIG
			HARV				2056	2245	1				INW
28	1330	2250	HARV				1809	1852	2	1809	1852	2	IIIN
29	1330	2345	HARV										
30	1330	2345	HARV				1912	2029	2				I
			HARV				2029	2159	1				IN
31	1330	2345	HARV				1330	1345	1				INW
			HARV				1515	1517	2	1515	1517		IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

NOVEMBER 1978

NOV 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
01	1330	2340	HARV				1339		1				IIIG
			HARV	1346		1							IIIG
			HARV	1404		2							IIIG
			HARV	1452	1453	1							IIIG
			HARV	1538	1542	2							IIIG
			HARV				1821		2				IIIG
02	1330	2340	HARV				1914		1				IIIB
			HARV				2006		1				IIIB
03	1330	2340	HARV				1515		2				IIIB
			HARV				1536		2				IIIB
04	1330	2340	HARV										
05	1350	2340	HARV				1829	1841	1				IIIG
			HARV				1907		2				IIIG
06	1350	2340	HARV				1507	2330	1				INW
			HARV				1642		1				IIIG
			HARV				1647	1648	1				IIIG
			HARV				1706		2				IIIG
07	1350	2340	HARV	1350	1442	2							I,DC
			HARV	1442	1538	1	1442	1559	1				IN
			HARV				1559	1853	2				I
			HARV				1709		3				IIIG
			HARV	1838	1844	1	1835	1847	3	1835	1847	3	IIIGG
			HARV				1853	2340	1				I
			HARV	1955	1956	1	1955	1956	3	1955	1956	3	IIIG
08	1350	2340	HARV				1350	2340	1				IN
			HARV	1751	1754	3	1751	1754	3	1751	1754	3	IIIGG,V
			HARV				1803	1805	2				II
			HARV				2030						IIIB
09	1345	2340	HARV				1621	1756	1				IIINW
			HARV				1759	1800	2	1759	1800	2	IIIG
			HARV				1904		2	1904		2	IIIG
			HARV				1907	1908	2	1907	1908	2	IIIG
10	1345	2340	HARV	1534	1535	2							IIIG
			HARV				1615		2				IIIB
			HARV				1630	1632	1				IIIG
			HARV				1641	2134	1				IN,IIIN
			HARV	1720	1721	2							IIIG
			HARV				2327		3				IIIG
11	1345	2340	HARV				1412	1417	3	1412	1417	3	IIIGG
			HARV	1417	1418	1							IIIG
			HARV				1526	1953	1				IN
			HARV				1536		2	1536		2	IIIG
			HARV				1600	2130	2	1600	2130	2	IIIN
			HARV				1923		3	1923		3	IIIG
			HARV				1953	2107	2				I
			HARV				2107	2340	1				IN
12	1345	2340	HARV										
			HARV				1700		3	1700		3	IIIG
			HARV	1823		1							IIIGW
			HARV	2046	2049	1							IIIG
			HARV	2108	2109	1							IIIG
13	1345	2234	HARV				1644	1647	3	1644	1647	3	IIIG
			HARV				1827		3	1827		3	IIIG
			HARV				2204	2208	3	2204	2208	3	IIIG
14	1551	2340	HARV										
15	1551	2340	HARV										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

NOVEMBER 1978

NOV 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
16	1345	2340	HARV										
20	1556	1850	HARV										
	1853	2340	HARV										
21	1400	2335	HARV				2030		3	2030		3	IIIB
			HARV				2032		1	2032		1	IIIB
22	1400	2335	HARV				1408	1409	2				IIIG
			HARV				1443	1445	1				IIIG
			HARV				2057		2	2057		2	IIIG
23	1400	2335	HARV				1731	1732	2	1731	1732	2	IIIG
24	1400	2335	HARV				1430		1				IIIB
25	1400	2335	HARV				1524		2	1524		2	IIIG
26	1400	2335	HARV										
27	1400	2335	HARV				1449		3	1449		3	IIIG
			HARV				1453	1454	2	1453	1454	2	IIIGG
			HARV				1542		3	1542		3	IIIB
			HARV				1604		2	1604		2	IIIB
			HARV				2057	2059	2	2057	2059	2	IIIG
			HARV				2215	2216	2	2215	2216	2	IIIG
28	1400	2335	HARV	1544		2	1544		2				IIIG
			HARV	1613	1617	2							IIIG
			HARV	1910	1911	2	1908	1911	2				
			HARV	2047	2048	3	2047	2048	2				IIIG
			HARV	2104		1	2104		2				IIIG
			HARV	2113	2114	1							IIIG
			HARV	2132		2							IIIG
			HARV	2215	2216	3							IIIG
29	1400	2335	HARV				1400	1403	1				I
			HARV	1403	1404	2	1403	1405	2				IIIG
			HARV	1426		2	1426	1428	1				IIIG
			HARV	1432	1433	1	1432	1434	3				IIIGG,V
			HARV				1522	1524	3				IIIGG,V
			HARV				1549	1554	2				II
			HARV				1632	1634	1				IIIG
			HARV				1803		2				IIIB
			HARV				1809	1810	3	1809	1810	3	IIIG
			HARV				1919		1				IIIG
			HARV	1944	1945	3	1941	1947	3	1941	1947	3	IIIGG,V
			HARV				1948	1955	3				II, H
			HARV				1958		1				IIIB
			HARV				2137	2139	2				IIIGG
			HARV				2151	2152	2				IIIG
			HARV	2154		1	2154		2	2154		1	IIIG
			HARV				2209	2217	1				IIIG
			HARV	2217	2219	1							IIIG
			HARV				2255		1				IIIB
30	1400	2335	HARV				1622		2				U
			HARV	1802		2	1802	1804	3	1802	1804	3	IIIG,V

The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of burst
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III

RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity
DCIM = Fast drift

COSMIC RAY INDICES

(Neutron Monitors)

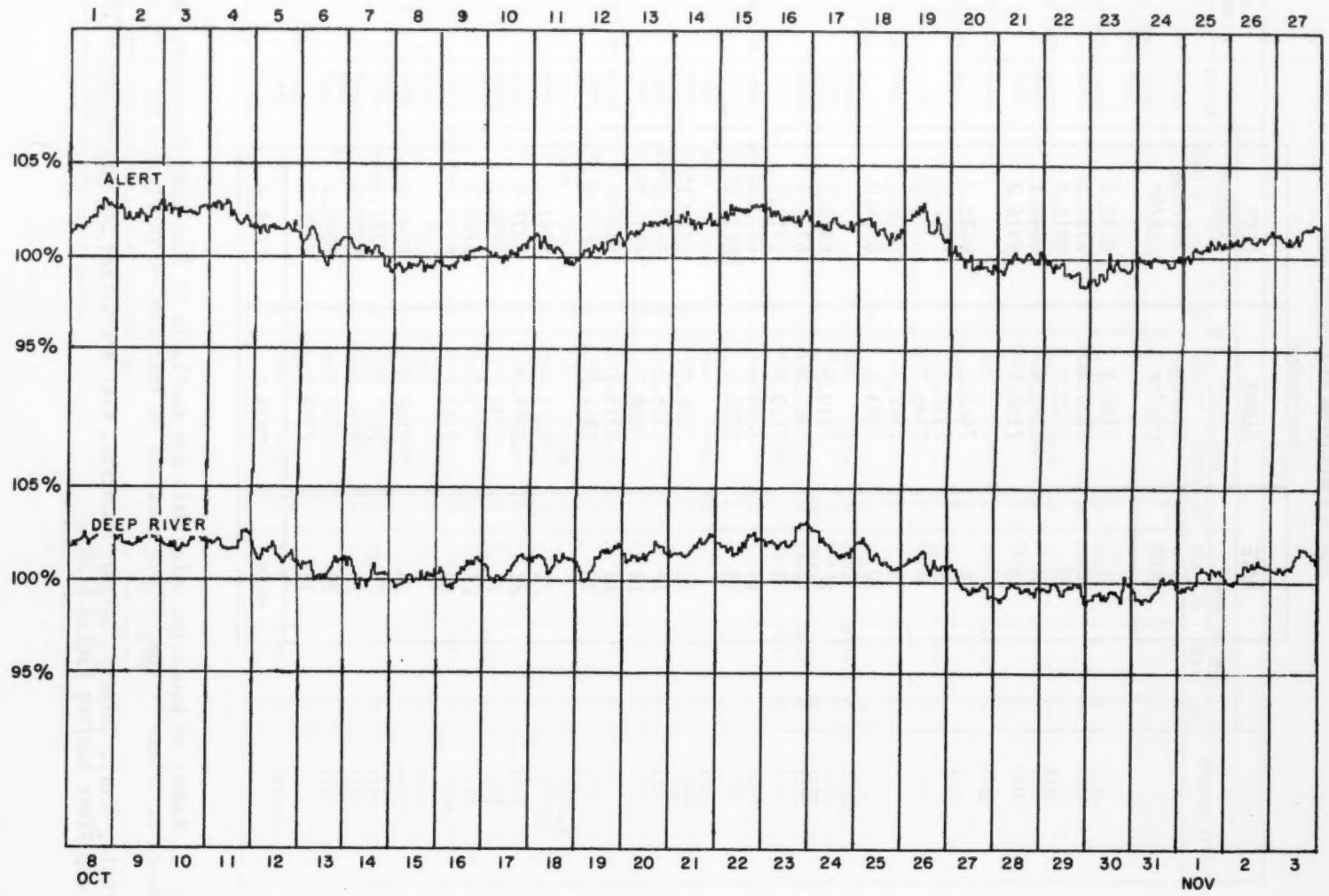
DATE Nov. 1978	ALERT Average cts/hr	DEEP RIVER Average cts/hr
1	7165.5	6752.5
2	7204.9	6788.5
3	7222.6	6815.5
4	7299.8	6840.1
5	7365.5	6916.3
6	7405.2	6922.7
7	7412.7	6977.7
8	7348.7	6920.2
9	7383.7	6936.2
10	7383.6	6938.0
11	7419.9	6940.3
12	7163.2	6735.1
13	7129.9	6717.7
14	7206.6	6748.3
15	7235.8	6828.8
16	7299.0	6878.1
17	7318.2	6899.8
18	7358.7	6915.7
19	7343.7	6922.1
20	7254.9	6872.5
21	7243.2	6851.4
22	7259.9	6837.9
12	7237.2	6798.3
24	7179.0	6768.3
25	7113.2	6733.2
26	7146.8	6757.6
27	7237.9	6791.9
28	7291.0	6835.3
29	7317.1	6868.8
30	7304.2	6898.2
MEAN	7275.1	6846.6

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Thule, Alert, Calgary, Sulphur Mountain, Kiel and Climax Scaling Factors = 100.
Deep River Scaling Factor = 300.

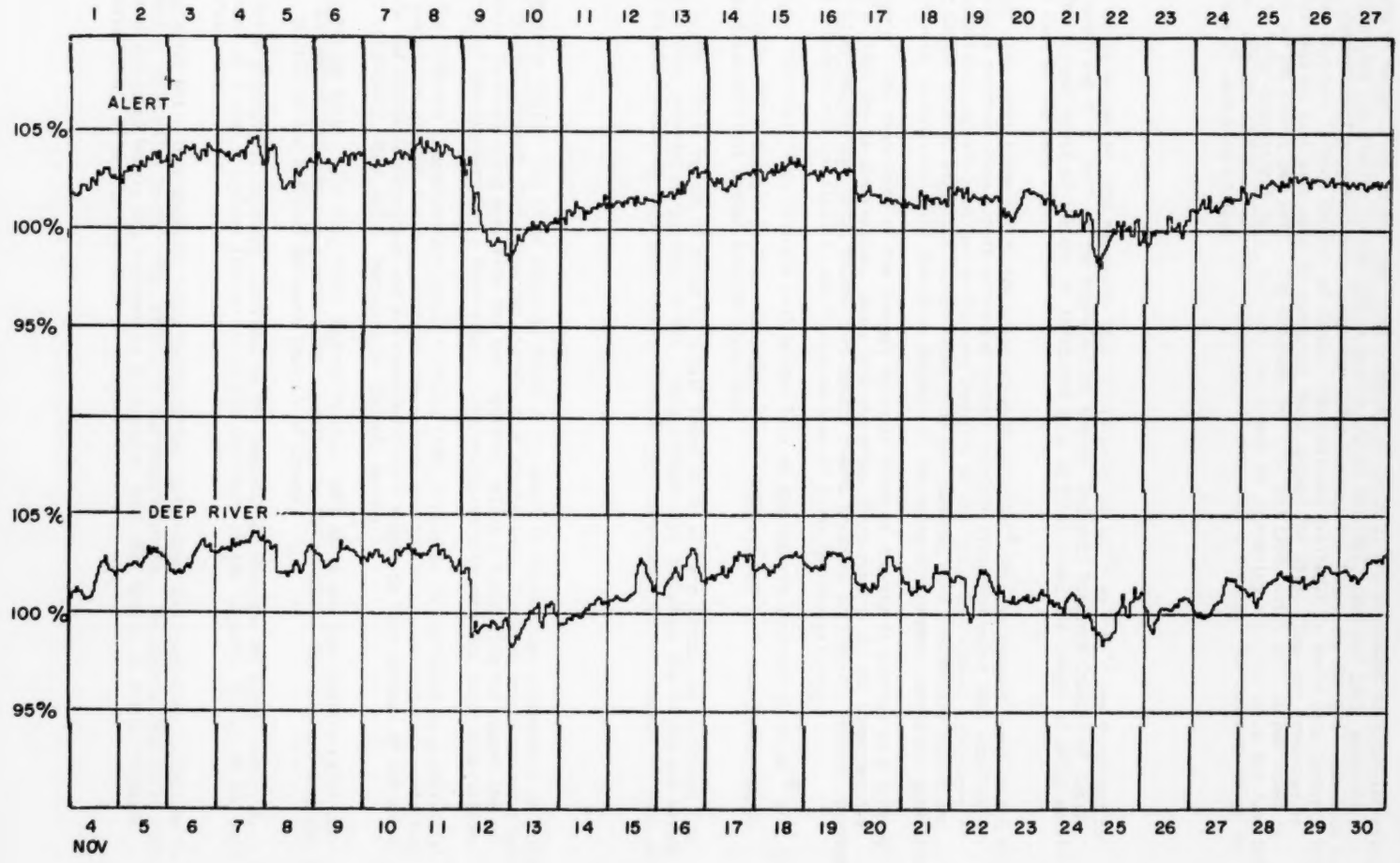
COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1985 (October-November 1978)



COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1986 (November 1978)



Solar-Terrestrial Activity 1976

The last 6 months of Solar Cycle 20 and the first 6 months of Cycle 21 are presented as Solar-Terrestrial Activity Graphs that are similar to the STAC-A Yearly Charts for 1967, 1968 and 1969, prepared by T. Obayashi, Interdisciplinary Analysis Center for Solar-Terrestrial Activity, National Committee on Solar-Terrestrial Physics, Science Council of Japan. Observations available in World Data Center A for Solar-Terrestrial Physics have been used to construct these graphs for 1976. They are presented in half yearly form on two charts per year. The diagrams for 1977 and 1978, which will be published in the next issue of Solar-Geophysical Data, indicate the trends of increasing activity since the June 1976 sunspot minimum. One can easily select individual days of outstanding events. The comments below describe the sources of each kind of data.

Graph 1

2800 MHz Flux: Daily values of 2800 MHz solar flux (S) in units of 10^{-22} Wm^{-2} Hz^{-1} are furnished by A. E. Covington and M. B. Bell of the Astrophysics Branch, National Research Council of Canada, Ottawa. The largest burst of the day is indicated by a vertical line, the length of which equals the square root of the peak flux.

1-8 Å X-Ray Flux: The burst intensity of the solar x-ray flux in Wm^{-2} for the largest event of the day is plotted as a vertical line. Both solid and dashed verticle lines represent data acquired by the GOES satellites and are provided by Richard Donnelly of the Space Environment Laboratory of NOAA. The dashed entries highlight values taken from the somewhat more preliminary report and forecast of solar-geophysical data that Gary Heckman of the Space Environment Laboratory publishes.

Hα Flare Importance: The importance of the largest Hα solar flare of the day is plotted as a vertical line. Solid lines denote observations taken from the group flare reports in the Comprehensive section of Solar-Geophysical Data; dashed bars denote flares based on preliminary records received on a rapid schedule and published in the Prompt section of Solar-Geophysical Data.

IMP 8 Proton Flux: Vertical lines indicate peak proton flux to the nearest power of 10 in cm^{-2} sr^{-1} s^{-1} MeV^{-1} observed by IMP 8 between 19.8 and 40.1 MeV. F. B. McDonald and T. T. van Rosenvinge of NASA, Goddard Space Flight Center furnish these data.

Solar Wind Bulk Speed: Daily values of solar wind bulk speed in km s^{-1} are plotted as estimated from the graphical data provided by Lazarus of MIT. Values shown here emphasize the minima and maxima that occur on time scales of less than a day. They do not represent a strict average for each day.

Graph 2

Stanford Mean Magnetic Field: The solar magnetic field daily means in microteslas represent a weighted average of the net magnetic field over the visible disk of the sun. Positive values denote a mean solar magnetic field pointing away from the sun; negative values a field directed toward the sun. P. H. Sherrer of the Stanford Solar Observatory, Stanford University provides these observations.

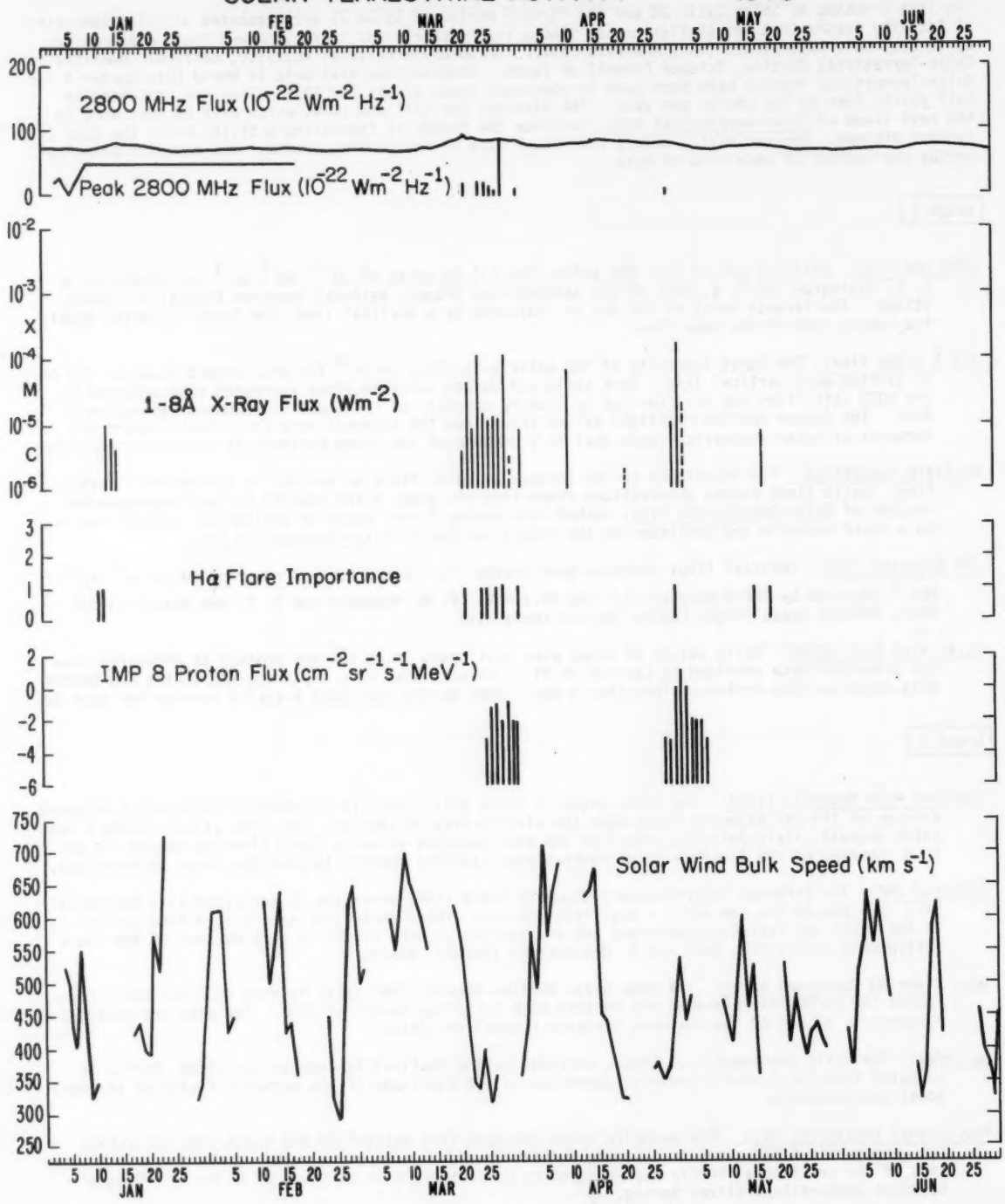
Inferred IMF: The inferred interplanetary magnetic field (IMF) direction is indicated as a horizontal bar: T = toward the sun and A = away from the sun. These polarities are derived from variations on the Thule and Vostok magnetograms and are reproduced here thanks to Gary Heckman of the Space Environment Laboratory, NOAA and S. Mansurov of IZMIRAN, Moscow.

Deep River NM Corrected Rates: The Deep River Neutron Monitor (NM) daily average counting rates corrected for barometric pressure are plotted with a scaling factor of 3000. The data are provided by Margaret D. Wilson of the National Research Council of Canada.

aa Index: The daily geomagnetic *aa* index, provided by the Institut de Physique du Globe, Paris, is computed from the 3-hour K indices (converted to the amplitude of the magnetic field) at two antipodal observatories.

Provisional Equatorial Dst: This magnetic index characterizes quiet-time and storm-time variations in the geomagnetic field owing to the ring current in the magnetosphere. The charts show daily averages of the provisional hourly Dst prepared by M. Sugiura, NASA GSFC and D. J. Poros, Computer Sciences Corporation, Silver Spring, MD.

SOLAR-TERRESTRIAL ACTIVITY 1976



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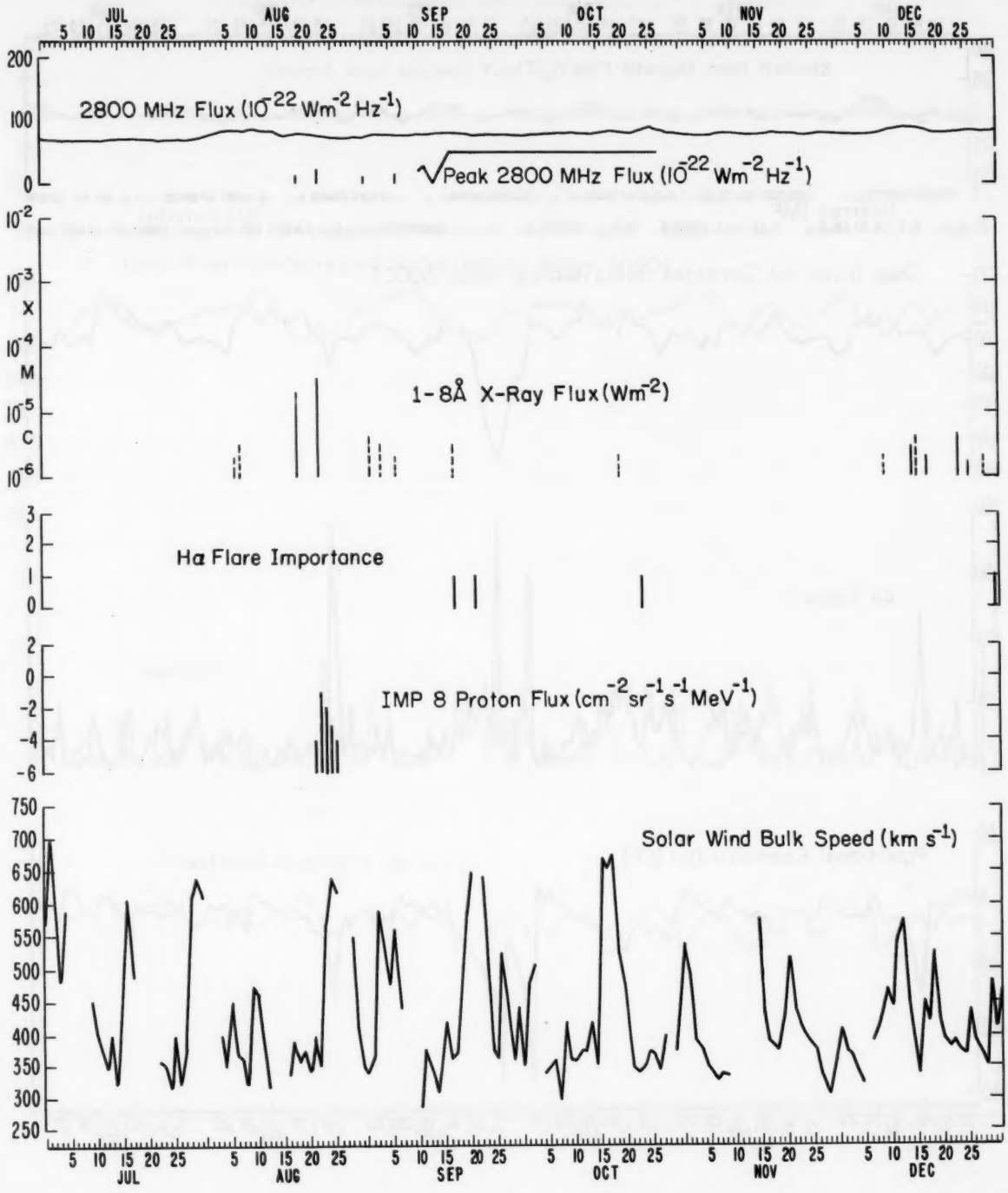

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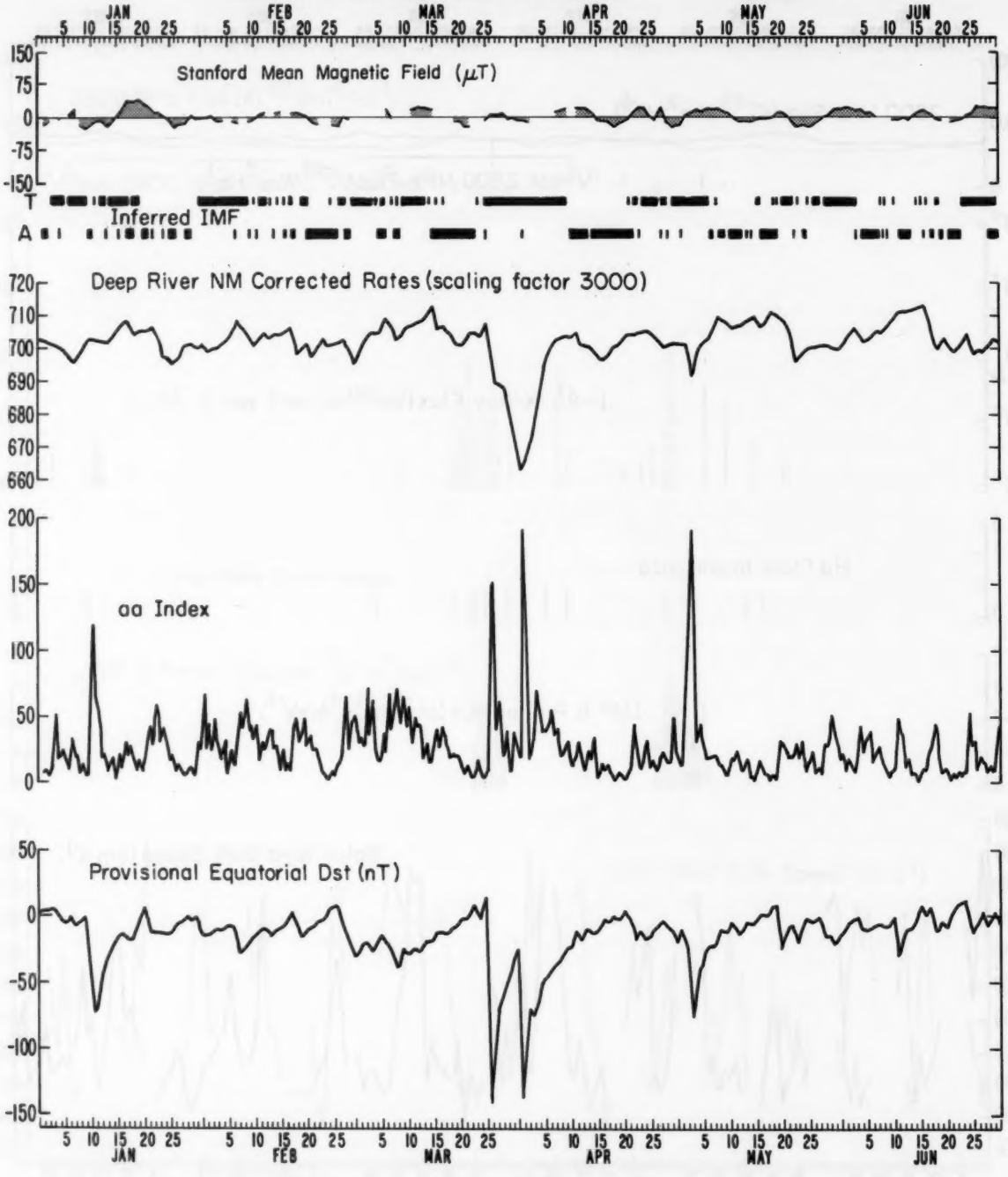

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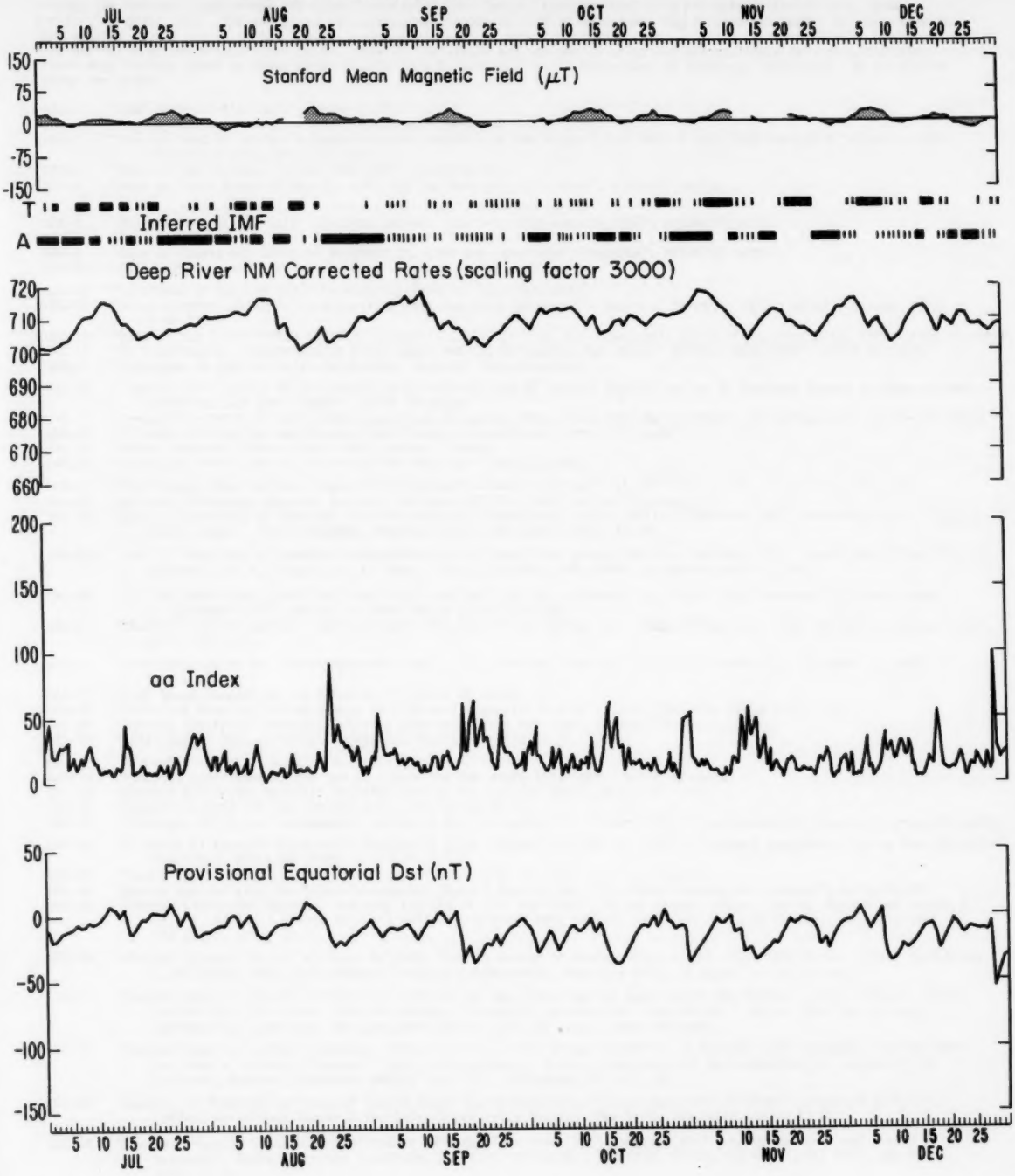

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